Missouri EPIDEMIOLOGIST

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INSIDE THIS ISSUE:

MEASLES IN MISSOURI, 1985

Five measles (rubeola) cases were confirmed in Missouri in 1985, all in children ages 12 to 17. Two of the cases were definitely imported, and two probably resulted from exposure outside Missouri. Three required hospitalization. Outbreak control measures were complicated by the ages of the patients and by other special circumstances, but only one of the cases resulted from spread of the disease within Missouri. Three cases might have been prevented by adequate immunization.

Case No. 1 occurred in February in a 16-year-old female military dependent who had recently entered Missouri from Tokyo, Japan to visit relatives. Her measles vaccination history was indefinite and no record was available. Serological testing confirmed that her symptoms were caused by measles. No spread cases occurred among exposed family members and friends.

Case No. 2, which also occurred in February, was epidemiologically linked to a large measles outbreak on the campus of a religious college in Illinois. The patient was a 17-year-old female whose older sister attended the college and had had a similar illness two weeks earlier. Because of the presence of a closely affiliated nursery/elementary/secondary school in St. Louis County, extensive cooperation between the schools and health officials of Illinois and Missouri was necessary to prevent the outbreak from spreading to Missouri. Immunization levels were extremely low due to the religious beliefs of most students. The Illinois campus was quarantined and all contact between the two campuses was stopped. Despite the total of 128 cases with three deaths at the Illinois campus, no further spread to Missouri occurred.

Case No. 3 was a 15-year-old female who had been vacationing in Florida during her exposure period in July. Her symptoms were compatible with measles, and laboratory testing indicated no prior immunity to measles despite a history of immunization at 12 months of age. She had been quite active during her prodromal period, attending a rock concert and visiting several shopping malls, theaters and restaurants. Due to the possible exposure of so many unrelated people, her case was publicized and all known contacts were followed by the local health department. No spread cases were detected.

The last two cases occurred in November and December. Case No. 4 was a 12-year-old female with an adequate immunization history. She was hospitalized with a high fever but did not develop a rash until the second day of hospitalization. She was isolated as soon as the rash appeared, and her illness was serologically confirmed as measles. The likely source of her infection was a club gathering in Illinois two weeks earlier. Illinois reported approximately 300 measles cases in 1985. A rash illness occurred in two members of her household, a two-year-old brother and her 33-year-old father. The father's serology ruled out measles, and initial testing on the brother was also negative.

Case No. 5 was a 16-year-old female without an adequate immunization history, who lived in the same community as Case No. 4 but was unrelated to her. She attended a different school and did not know the family of Case No. 4, but her rash developed two weeks after Case No. 4. The only link which could be established was the fact that Case No. 5 had visited her sister in the hospital during the time Case No. 4 was hospitalized. She too was hospitalized and placed immediately in isolation.

The potential for spread in this community was considered serious, since both girls had attended school and been hospitalized during their infectious periods. All school immunization records were reviewed and students without adequate vaccine histories were required to be immunized or excluded from school. Hospital employees and visitors were also followed. All local physicians were notified and active surveillance was continued for several weeks. No new cases were detected in Missouri, but Illinois subsequently reported two cases in the "sister city" across the river.

Several aspects of these cases deserve our attention. First, only one of the cases resulted from exposure within Missouri. A history of travel outside the state two to three weeks prior to rash onset should arouse suspicion of measles. While Missouri is relatively free of indigenous measles transmission, this is not true in other areas of the U.S. and particularly in foreign countries. Sizeable outbreaks have recently occurred in Illinois and Kansas.

Second, there are still a number of individuals, particularly teenagers and young adults, who are susceptible to measles. Some were immunized too early in life or with the "killed" type of vaccine. Others remain unimmunized because of their religious beliefs, or because they somehow missed immunization and escaped natural infection. Health care providers who serve this age group should encourage immunization and be particularly suspicious of any rash illness.

Third, measles transmission within hospitals is a serious concern. The Missouri Department of Health recommends that all hospital employees have adequate proof of immunity to measles and rubella for this reason.

Over 400 rash illnesses were reported and investigated in Missouri during 1985. Fortunately, prompt reporting helped to control the spread of the disease in all of the cases described above. Please call your local health department immediately whenever measles or rubella is suspected.

DEPARTMENT LIAISON INCREASES EPIDEMIOLOGIC INVESTIGATION

The Bureau of Communicable Diseases has been promoting liaison with district, county and city health agencies during recent months. Informal presentations on the concept of an epidemic investigation network were given in all districts of the state. Contact persons have been identified in most of the districts. District 4 in southeast Missouri has named Ron Cates as coordinator, and he has developed active surveillance of communicable diseases in that district.

Three basic courses and one advanced training course have been conducted during FY86. During the past two years, 203 individuals have completed the basic course and 55 the advanced course in epidemiology. The courses are designed by the Centers for Disease Control in Atlanta.

The Bureau has also developed a loose-leaf manual of communicable disease procedures which has been distributed to all district and local public health agencies.

During the current fiscal year, 18 investigations have already been completed compared to 24 in FY85 and 15 in FY84, which suggests that the network concept and training are proving their worth to the state.

TOXIC SHOCK SYNDROME SURVEILLANCE

The Missouri Department of Health began surveillance and casefinding for Toxic Shock Syndrome (TSS) on January 1. This study is funded by a Centers for Disease Control grant. The study will determine the current incidence of TSS and will provide information on the association of TSS with menstruation, tampon usage and other risk factors. In addition, surveillance will be conducted for meningitis and bacteremia caused by Haemophilus influenzae, Streptococcus pneumonia, Neisseria meningitis, group B Streptococcus, and Listeria monocytogenes.

A contact person has been identified in all participating hospitals and laboratories. Each contact will be telephoned every two weeks to obtain case reports.

REVISED GUIDELINES FOR PREVENTION AND CONTROL OF NOSOCOMIAL INFECTIONS

The Centers for Disease Control "Guidelines for the Prevention and Control of Nosocomial Infections" has issued two revisions: "Hospital Environmental Control" and "Prevention of Surgical Wound Infections". These guidelines supersede those published in 1982. The Missouri Nosocomial Infections Program plans to reprint them for Missouri hospitals.

In the interim, these guidelines are available for purchase from National Technical Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161, Telephone 703/ 487-4650. The charge is $7.00 for each guidelines plus a $3.00 handling charge per order.

Recommendation of the Immunization Practices Advisory Committee (ACIP)

Polysaccharide Vaccine for Prevention of Haemophilus influenzae Type b Disease

INTRODUCTION

A polysaccharide vaccine* against invasive (bacteremic) disease caused by *Haemophilus influenzae* type b recently has been licensed in the United States. The purposes of this statement are to summarize available information about this vaccine and to offer guidelines for its use in the prevention of invasive *H. influenzae* type b disease.

HAEMOPHILUS INFLUENZAE DISEASE

H. influenzae is a leading cause of serious systemic bacterial disease in the United States. It is the most common cause of bacterial meningitis, accounting for an estimated 12,000 cases annually, primarily among children under 5 years of age. The mortality rate is 5%, and neurologic sequelae are observed in as many as 25%-35% of survivors. Virtually all cases of *H. influenzae* meningitis among children are caused by strains of type b (Hib), although this capsular type represents only one of the six types known for this species. In addition to bacterial meningitis, Hib is responsible for other invasive diseases, including epiglottitis, sepsis, cellulitis, septic arthritis, osteomyelitis, pericarditis, and pneumonia. Nontypeable (noncapsulated) strains of *H. influenzae* commonly colonize the human respiratory tract and are a major cause of otitis media and respiratory mucosal infection but rarely result in bacteremic disease. Hib strains account for only 5%-10% of *H. influenzae* causing otitis media.

Several population-based studies of invasive Hib disease conducted within the last 10 years have provided estimates of the incidence of disease among children under 5 years of age, the major age group at risk. These studies have demonstrated attack rates of meningitis ranging from 51 cases per 100,000 children to 77/100,000 per year and attack rates of other invasive Hib disease varying from 24/100,000 to 75/100,000 per year (*1*). Thus, in the United States, approximately one of every 1,000 children under 5 years of age develops systemic Hib disease each year, and a child's cumulative risk of developing systemic Hib disease at some time during the first 5 years of life is about one in 200. Attack rates peak between 6 months and 1 year of age and decline thereafter. Approximately 35%-40% of Hib disease occurs among children 18 months of age or older, and 25% occurs above 24 months of age.

Incidence rates of Hib disease are increased in certain high-risk groups, such as Native Americans (both American Indians and Eskimos), blacks, individuals of lower socioeconomic status, and patients with asplenia, sickle cell disease, Hodgkin's disease, and antibody deficiency syndromes. Recent studies also have suggested that the risk of acquiring primary Hib disease for children under 5 years of age appears to be greater for those who attend day-care facilities than for those who do not (*2,3*).

The potential for person-to-person transmission of systemic Hib disease among susceptible individuals has been recognized in the past decade. Studies of secondary spread of Hib disease in household contacts of index patients have shown a substantially increased risk of disease among exposed household contacts under 4 years of age (*4*). In addition, numerous clusters of cases in day-care facilities have been reported, and recent studies suggest that secondary attack rates in day-care classroom contacts of a primary case also may be increased (*5,6*).

*Official name: Haemophilus b Polysaccharide Vaccine.

HAEMOPHILUS b POLYSACCHARIDE VACCINE

The Hib vaccine is composed of the purified, capsular polysaccharide of *H. influenzae* type b ([→3] ribose-β1 →1 ribitol-1 phosphate-5→). Antibodies to this antigen correlate with protection against invasive disease. The Hib vaccine induces an antibody response that is directly related to the age of the recipient; infants respond infrequently and with less antibody than do older children or adults (*7*). Improved responses are observed by 18 months of age, although children 18-23 months of age do not respond as well as those 2 years of age or older. The frequency and magnitude of antibody responses reach adult levels at about 6 years of age (*8,9*). Levels of antibodies to the capsular polysaccharide also decline more rapidly in immunized infants and young children than in adults.

In a manner similar to other polysaccharide antigens, revaccination with Hib vaccine results in a level of antibody comparable to that for a child of the same age receiving a first immunization (*10*). Such polysaccharide antigens have been termed "T-cell independent" because of their failure to induce the T-cell memory response characteristic of protein antigens.

Limited data are available on the response to Hib vaccine in high-risk groups with underlying disease. By analogy to pneumococcal vaccine, patients with sickle cell disease or asplenia are likely to exhibit an immune response to the Hib vaccine. Patients with malignancies associated with immunosuppression appear to respond less well. Additional data on the immune response to Hib vaccine in these groups are needed.

A precise protective level of antibody has not been established. However, based on evidence from passive protection in the infant rat model and from experience with agammaglobulinemic children, an antibody concentration of 0.15 μg/ml correlates with protection (*7,8,11*). In the Finnish field trial, levels of capsular antibody greater than 1 μg/ml in 3-week postimmunization sera correlated with clinical protection for a minimum of 1½ years (*9,12,13*). Approximately 75% of children 18-23 months of age tested achieved a level greater than 1 μg/ml, as did 90% of 24-35 month old children (*9*). Measurement of Hib antibody levels is not routinely available, however, and determination of antibody levels following vaccination is not indicated in the usual clinical setting.

EFFECTIVENESS OF VACCINE

In 1974, a randomized, controlled trial of clinical efficacy was conducted in Finland among children 3-71 months of age (*9*). Approximately 98,000 children, half of whom received the Hib vaccine, were enrolled in the field trial and followed for a 4-year period for occurrence of Hib disease. Among children 18-71 months of age, 90% protective efficacy (95% confidence limits, 55%-98%) in prevention of all forms of invasive Hib disease was demonstrated for the 4-year follow-up period. Although no disease occurred among over 4,000 children 18-23 months of age immunized with Hib vaccine and followed for 4 years, only two cases occurred in the control vaccine recipients in this age group. As a result, vaccine efficacy in the subgroup of children immunized at 18-23 months of age could not be evaluated statistically. The vaccine was not efficacious in children under 18 months of age.

REVACCINATION

Limited data regarding the potential need for revaccination are available at present. Current data show that children who have received the Hib vaccine 2-42 months previously have an immune response to the vaccine similar to that in previously unvaccinated children of the same age. No immunologic tolerance or impairment of immune response to a subsequent dose of vaccine occurs (*10*). As with other polysaccharide vaccines, the shorter persistence of serum antibodies in young children given Hib vaccine, compared with adults, suggests that a second dose of vaccine may be needed to maintain immunity throughout the period of risk, particularly for children in the youngest age group considered for vaccination (those 18-23 months of age). A second injection following the initial dose is likely to increase the protective benefit of vaccination for this high-risk group, because antibody titers 18 months after vaccination, although detectable in most vaccine recipients, are no longer significantly different from those in unvaccinated children of the same age.

RECOMMENDATIONS FOR VACCINE USE

Recently published data regarding vaccine efficacy and the risk of Hib disease among young children strongly support the use of Hib vaccine in the United States in high-risk persons for whom efficacy has been established. Specific recommendations are as follows:

1. **Immunization of all children at 24 months of age is recommended.** The precise duration of immunity conferred by a single dose of Hib vaccine at 24 months of age is not known, although, based on available data, protection is expected to last 1½-3½ years. Until further data are available to determine whether an additional dose of vaccine may be necessary to ensure long-lasting immunity, routine revaccination is not recommended.
2. **Immunization of children at 18 months of age, particularly those in known high-risk groups, may be considered.** Although the precise efficacy of the vaccine among children 18-23 months of age is not known, this age group accounts for approximately 12% of all invasive Hib disease among children under 5 years of age, and Hib vaccine has been shown by serologic methods to be immunogenic in most children of this age group. However, physicians and parents should be informed that the vaccine is not likely to be as effective in this age group as in older children. These younger children may need a second dose of vaccine within 18 months following the initial dose to ensure protection. Additional data regarding the duration of the antibody response are needed to define the timing of a second dose more precisely.

   Children who attend day-care facilities are at particular risk of acquiring systemic Hib disease. Initial vaccination at 18 months of age for this high-risk group should be considered.

   Children with chronic conditions known to be associated with increased risk for Hib disease should receive the vaccine, although only limited data on immunogenicity and clinical efficacy in this group are available. These conditions include anatomic or functional asplenia, such as sickle cell disease or splenectomy (*14*), and malignancies associated with immunosuppression (*15*).
3. **Immunization of individuals over 24 months of age who have not yet received Hib vaccine should be based on risk of disease.** The risk of invasive Hib disease decreases with increasing age over the age of 2 years. Because the vaccine is safe and effective, however, physicians may wish to immunize previously unvaccinated healthy children between 2 years and 5 years of age to prevent the Hib disease that does occur in this age group. The potential benefit of this strategy in terms of cases prevented declines with increasing age of the child at the time of vaccination. Therefore, children 2-3 years of age who attend day-care facilities should be given a higher priority than day-care attendees who are 4-5 years old.
4. **Insufficient data are available on which to base a recommendation concerning use of the vaccine in older children and adults with the chronic conditions associated with an increased risk of Hib disease.**
5. **Vaccine is not recommended for children under 18 months of age.**
6. **Simultaneous administration of Hib and DTP vaccines at separate sites can be performed, because no impairment of the immune response to the individual antigens occurs under these circumstances.**

SIDE EFFECTS AND ADVERSE REACTIONS

Polysaccharide vaccines are among the safest of all vaccine products. To date, over 60,000 doses of the Hib polysaccharide vaccine have been administered to infants and children, and several hundred doses have been given to adults (*9, 16*). Only one serious systemic reaction has been reported thus far—a possible anaphylactic reaction that responded promptly to epinephrine. High fever (38.5 C [101.3 F] or higher) has been reported in fewer than 1% of Hib vaccine recipients. Mild local and febrile reactions were common, occurring in as many as half of vaccinated individuals in the Finnish trial. Such reactions appeared within 24 hours and rapidly subsided. Current preparations appear to result in fewer such local reactions. Simultaneous administration with DTP does not result in reaction rates above those expected with separate administration (*17*).

PRECAUTIONS AND CONTRAINDICATIONS

The Hib vaccine is unlikely to be of substantial benefit in preventing the occurrence of secondary cases, because children under 2 years old are at highest risk of secondary disease. Because the vaccine will not protect against nontypeable strains of *H. influenzae*, recurrent upper respiratory diseases, including otitis media and sinusitis, are not considered indications for vaccination.

NEW VACCINE DEVELOPMENT

New vaccines, such as the Hib polysaccharide-protein conjugate vaccines, are being developed and evaluated and may prove to be efficacious for children under 18 months of age.

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AIDS UPDATE

As of Feburary 18, 1986, the Missouri Department of Health has confirmed 91 cases of Acquired Immune Deficiency Syndrome (AIDS) since the first case was reported in 1982. From this total, 46 deaths have occurred. In addition to the cases reported, 21 suspected cases were pending diagnosis on February 18.

A summary of illnesses and patient characteristics and risk factors for all cases reported in the state from 1982 to date:

Illness Characteristics

1 - Both KS* and PCP* (Without Other OI*)
4 - Both KS and PCP (With Other OI)
7 - KS Alone
28 - PCP Alone
5 - KS Without PCP (but with Other OI)
26 - PCP Without KS (but with Other OI)
20 - OI Without KS or PCP

Risk Factors**

6 - Cases with IV Drug Abuse
8 - Cases with Underlying Hemophilia
73 - Cases with Gay Exposure
2 - Case Received Blood Transfusion
2 - Cases with Unknown or No Apparent Risk Factors

Patient Characteristics

73 - White (1 of Hispanic origin; 1 of probable Hispanic origin)
18 - Black
88 - Male
3 - Female Average Age = 37.1

*KS--Kaposi's sarcoma
*PCP--Pneumocystis carinii pneumonia
*OI--Opportunistic Infection

The Missouri Department of Health is currently sponsoring the operation of 11 screening sites for HTLV-III virus antibody testing through county and city health departments. The sites, which began testing on June 3, 1985, provide alternate locations where high-risk individuals may be tested to encourage them not to offer to donate blood simply to be tested.

As of February 7, 1,175 individuals had been tested and 230 were positive. The screening period for HTLV-III virus antibody testing has been extended through April 30.

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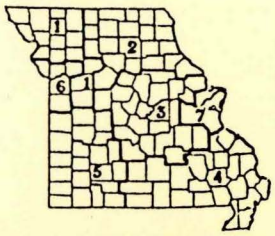


MISSOURI DEPARTMENT OF HEALTH – Epidemiology Services – Communicable Disease Control

BIMONTHLY MORBIDITY REPORT

Reporting Period* November and December , 19 85

	DISTRICTS							Kansas City	St. Louis City	St. Louis County	2 Month State Totals		Cumulative		
	1	2	3	4	5	** 6	** 7				1985	1984	for 1985	for 1984	5 Year Median
Vaccine Preventable Dis.															
Chickenpox	33	8	38	308	37	3	1	0	0	0	428	735	2474	2565	
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Influenza	0	0	0	0	0	0	0	0	0	0	0	0	61	39	
Measles	0	2	0	0	0	0	0	0	0	0	2	2	5	6	
Mumps	3	0	1	0	0	0	1	0	0	0	5	1	18	11	
Pertussis	0	0	0	0	0	1	0	4	1	0	6	3	35	23	
Polio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rubella	0	0	0	0	0	0	0	0	0	0	0	0	7	0	
Tetanus	0	0	0	0	0	0	0	0	0	0	0	1	3	6	
Viral Hepatitis															
A	0	0	0	1	3	0	0	3	0	1	8	3	98	138	
B	2	1	6	9	4	7	0	11	5	9	54	41	359	297	
Non A – Non B	0	2	0	0	1	0	0	2	0	0	5	5	42	46	
Unspecified	0	0	1	0	1	0	0	1	0	1	4	1	24	18	
Meningitis															
Aseptic	4	1	0	2	1	2	1	2	0	0	13	23	156	95	
H. influenza	2	0	4	3	2	0	0	0	2	3	16	20	109	104	
Meningococcal	2	0	1	0	0	0	2	1	0	1	7	10	46	53	
Other	1	0	1	1	0	0	0	1	0	1	5	8	47	51	
Enteric Infections															
Campylobacter	4	0	1	3	9	2	5	7	2	10	43	60	304	260	
Salmonella	7	0	15	16	61	1	6	12	33	10	161	87	690	617	
Shigella	0	0	0	0	0	0	0	3	8	2	13	55	143	244	
Typhoid Fever	0	0	2	0	0	0	0	1	0	0	3	1	6	6	
Parasitic Infections															
Amebiasis	1	0	1	2	0	0	0	0	0	0	4	13	28	40	
Giardiasis	19	6	8	16	3	18	8	6	0	11	95	128	459	462	
Toxoplasmosis	0	0	0	1	1	0	0	2	0	0	4	3	19	20	
Sexually Transmitted Dis.															
AIDS	0	0	0	1	3	0	0	2	5	2	13	3	51	28	
Gonorrhea	52	31	140	122	152	96	54	1127	1280	391	3445	3648	20023	20042	
Genital Herpes	8	0	26	1	2	2	1	36	59	45	180	144	1261	607	
Nongonococcal urethritis	26	10	72	10	94	28	17	281	582	185	1305	1294	7895	8445	
Primary & secondary syphilis	0	0	0	8	4	2	1	6	7	2	30	29	133	186	
Tuberculosis															
Extrapulmonary	0	1	1	1	1	0	0	2	2	0	8	8	49	38	
Pulmonary	1	5	8	7	17	2	2	9	8	5	64	74	262	316	
Zoonotic															
Animal Bites	3	1	6	25	4	11	9	0	1	1	61	17	350	318	
Psittacosis	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Rabies (Animal)	0	1	2	4	0	0	0	0	0	0	7	9	59	70	
Rocky Mtn. Spotted Fever	0	0	0	0	1	0	0	0	0	0	1	1	10	14	
Tularemia	0	0	0	2	2	0	0	0	0	0	4	2	35	42	

Low Frequency Diseases

Anthrax
Botulism
Brucellosis – 4
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease – 1
Legionnellosis – 2
Leptospirosis – 2
Lymphogranuloma Venereum
Malaria
Plague
Rabies (human)
Reye's Syndrome
Toxic-Shock Syndrome – 1
Trichinosis

Outbreaks

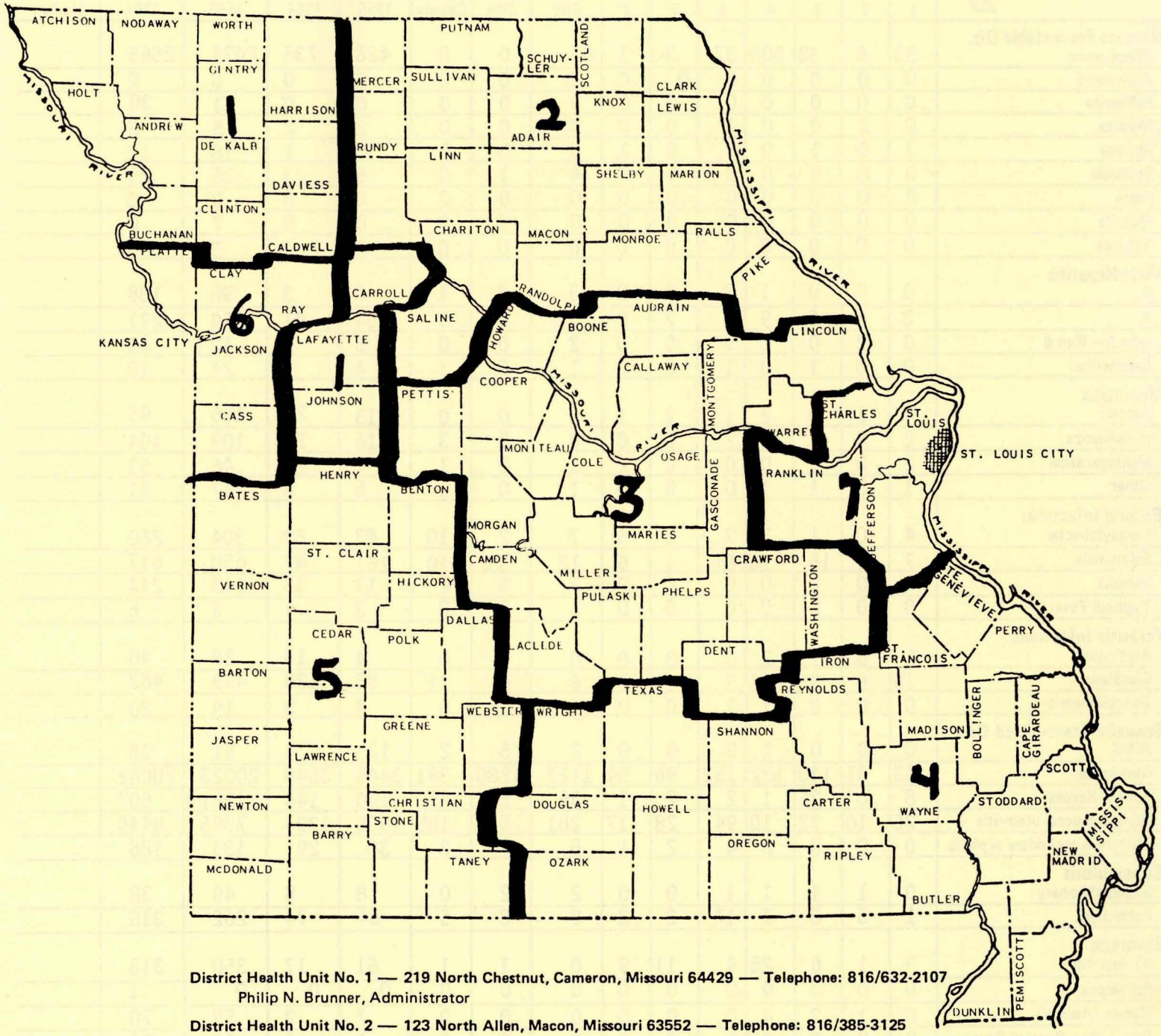
Foodborne/waterborne
Histoplasmosis
Nosocomial
Pediculosis
Scabies
Other

*Reporting Period Beginning Nov. 2, Ending Dec. 27.

**Totals do not include KC, SLC, or SLCo.

Due to data editing, totals may change.

MISSOURI DEPARTMENT OF HEALTH



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INSIDE THIS ISSUE:
Toxic Shock Syndrome: A Case Review; Malaria Prevention for International Travelers; Survey of Readers; Bureau of Radiological Health

TOXIC SHOCK SYNDROME: A CASE REVIEW

Active surveillance and cases of toxic shock syndrome (TSS) continue throughout the state, with five cases reported in January and February.

One of these five cases included a 59-year-old white male who was admitted to a hospital with a history of jaundice, nausea, vomiting, mid-abdominal pain, and weight loss. Surgery revealed adenocarcinoma of the retroperitoneum including the portal vein. A bypass procedure was performed with a choledochojejunostomy and a gastrojejunostomy. Vital signs were stable post-operatively and he was given clindamycin and gentamycin.

1 Week Post-Op: The patient was noted to have a temperature of 100.4° F. and a large biliary output per Davol drain thought to be due to the needle biopsy site.

2 Weeks Post-Op: The patient continued to be febrile with a temperature of 101.4° F. and a white blood cell count of 35,000. On two occasions the patient recorded a blood pressure of 90/60. He was noted to have the following abnormal serologic values: LDH 520 IU/L (normal 91-180 IU/L); CPK 280 IU/L (upper limits of normal 150 IU/L); BUN 150 mg/dl (normal 5-25 mg/dl); creatinine 9.1 mg/dl (normal 0.5-1.4 mg/dl). The patient was thought to be in non-oliguric acute renal failure due to gentamycin toxicity and the gentamycin was discontinued. He was found to be confused and to have a nonpruritic, red, maculopapular rash over his trunk and extremeties with some edema and coalescing. The rash was felt to be a uremic rash or Stevens-Johnson syndrome. Drainage from the Davol drain was amber and purulent. A chest x-ray revealed pulmonary edema. Suspicion that the patient was septic prompted the removal and culturing of the subclavian central venous pressure line as well as blood, sputum, wound, urine and Davol drain.

3 Weeks Post-Op: Rash, fever (T=103.6° F.) and chills continued. His face was flushed and his eyelids and sclera as well as extremities were noted to be edematous. Abnormal serologic values included a creatine level of 7.8 mg/dl and BUN 58 mg/dl. Staphlococcus aureus, which is resistant to ampicillin, clindamycin, erythromycin, gentamycin, penicillin, trimethoprim-sulfamethoxazole, oxacillin and mezlocillin, was isolated from every site tested. Purulent drainage continued via Davol drain but a CAT scan was negative for suspected intra-abdominal abscess. Patient was treated with vancomycin.

4 Weeks Post-Op: The patient continued to be febrile and to have a generalized rash. He was lethargic, intermittently confused, and began vomiting. An echocardiogram ruled out a suspected subacute bacterial endocarditis. A repeat exploratory laparotomy ruled out an intra-abdominal abscess. The wound could not be completely closed due to the large exudate which also grew multiply resistant Staphlococcus aureus.

Forty days after the initial surgery, the patient was sent home to attempt home care. His arm and face were desquamating at the time of discharge. The patient subsequently died.

TSS Criteria	Patient Clinical History
Fever	+
Rash	+
Desquamation	+
Hypotension	+
Involvement of three or more of the following systems:	
Gastrointestinal	+
Muscular	+
Mucous membrane	?
Renal	+
Hepatic	*
Hematologic	-

* Bilirubin, SGOT, and SGPT were abnormal prior to surgery only.

This patient meets the criteria to be considered a confirmed case of TSS but also demonstrated the complexity of diagnosing post-surgical patients who have multisystem involvement. This patient, for example, was only noted to be hypotensive (systolic blood pressure = 90 mm/hg) on two occasions. No orthostatic blood pressure was recorded. The rash was noted to have unknown etiology.

There is no definitive test to diagnose TSS, but the case criteria are very restrictive and there are few other syndromes or processes which meet all of the criteria, including negative blood, throat and cerebrospinal fluid cultures if they are done. (Note: the criteria allow these cultures to be positive for S. aureus.) Positive S. aureus cultures may enhance the diagnosis but the absence of such cultures does not rule out TSS.[1]

Also, the Minnesota Department of Health recently reported two confirmed and four probable cases of TSS following influenza infection. The two confirmed cases occurred in teenage males with an antecedent illness laboratory-confirmed to be influenza B. Both had pulmonary infiltrates noted on x-rays, and S. aureus isolated for respirations. Four probable TSS cases occurred in persons who had experienced an influenza-like illness. All four presented with severe shock, fever, and multisystem involvement. None of the cases displayed the TSS rash, but the three surviving cases desquamated.

Fourteen additional cases of profound hypotension following influenza-like illnesses in otherwise healthy persons have also been reported to the Centers for Disease Control (CDC). The cases are under investigation to confirm the TSS diagnosis and to evaluate the relationship of the hypotensive episodes with influenza.[2]

Be on the alert for the TSS-like illness occurring in patients with influenza. Also, if any patient presents with some or all of the criteria for TSS, please contact the Missouri Department of Health at (314)751-8212 or (800)392-0272. The case definition follows.

REFERENCES

1. Oklahoma Department of Health
2. Centers for Disease Control: "Toxic Shock Syndrome Associated with Influenza - Minnesota." MMWR, March 7, 1986.

CASE DEFINITION OF TOXIC-SHOCK SYNDROME

Fever: temperature greater than or equal to 38.9 degrees C (102 F)

Rash: diffuse macular erythroderma

Desquamation: one to three weeks after onset of illness

Hypotension: systolic blood pressure less than or equal to 90 mm Hg for adults or below fifth percentile by age for children below 16 years of age, orthostatic drop in diastolic blood pressure greater than or equal to 15 mm Hg from lying to sitting, orthostatic syncope, or othostatic dizziness.

Multisystem involvement: three or more of the following:

Gastrointestinal:	vomiting or diarrhea at onset of illness
Muscular:	severe myalgia or creatine phosphokinase level at least twice the upper limit of normal for laboratory
Renal:	blood urea nitrogen or creatinine at least twice the upper limit for normal for laboratory or urinary sediment with pyuria (greater than or equal to 5 leukocytes per high-power field) in the absence of urinary-tract infection
Hepatic:	total bilirubin, ALT*, AST** at least twice the upper limit of normal for laboratory
Hematologic:	platelets less than 100,000
Central nervous system:	disorientation or alterations in consciousness without focal neurologic signs when fever and hypotension are absent

Negative results on the following tests, if obtained:

Blood, throat, or cerebrospinal fluid cultures (cultures may be positive for Staphlococcus aureus)

Rise in titer to Rocky Mountain spotted fever, leptospirosis, or rubeola

*ALT denotes serum alanine transaminase
**AST denotes serum aspartate transaminase

MALARIA PREVENTION FOR INTERNATIONAL TRAVELERS

Risk of Acquiring Malaria. Malaria transmission occurs in large areas of Central and South America, sub-Saharan Africa, the Indian subcontinent, Southeast Asia, and Oceania. The estimated risk of acquiring malaria varies markedly from area to area. American travelers to these areas may be at risk of contracting malaria, depending upon their itineraries and the intensity of transmission within the various regions. During 1982-84, 358 cases of Plasmodium falciparum malaria among American civilians were reported to the Centers for Disease Control (CDC). Of these, 256 (72%) were acquired in sub-Saharan Africa, 11 (3%) were acquired in Southeast Asia, and seven (2%) were acquired in South America. Ten of the infections were fatal, including nine acquired in sub-Saharan Africa. Travelers to Africa are at risk in both rural and urban areas, and tend to spend considerable amounts of time in rural areas where risk is highest such as in game parks. Twenty-seven cases of malaria have been reported in Missouri since 1982.

Information on malaria risk is available to travelers and health care providers by calling a local or district health office. Callers should be familiar with the traveler's itinerary by country and, if possible, by region/city within each country.

Symptoms. Malaria in humans is caused by four protozoan species of the genus Plasmodium. All are transmitted by the bite of an infected female Anopheles mosquito. The disease is characterized by headache, malaise, fever, chills and sweats, which may occur at intervals. Malaria may cause anemia and jaundice; in the case of P. falciparum infections, it may cause kidney failure, coma and even death. Deaths due to malaria are preventable.

General Advice for Travelers to Malaria-Endemic Areas. Travelers must be informed that regardless of the preventive measures employed, it is still possible to contract malaria. The symptoms of malaria, such as fever with chills and headache, demand medical attention as soon as possible, and should not be presumptively ascribed to a "flu-like" illness. Malaria symptoms can develop as early as eight days after initial exposure and can appear months after departure from a malarious area, even after chemoprophylaxis is discontinued. It is important for travelers to understand that malaria can be effectively treated early in the course of the disease but delays before treatment can have serious or even fatal consequences.

Personal Protection Measures. Because of the nocturnal feeding habits of most Anopheles mosquitos, malaria transmission occurs primarily between dusk and dawn. Travelers must be advised of the importance of measures to reduce contact with mosquitos during those hours, such as remaining in well-screened areas, using mosquito nets, and wearing clothes that cover most of the body. Additionally, travelers should be advised to take along insect repellent to use on any exposed areas of skin. The most effective repellents contain N,N--diethyl--m--toluamide (deet)--an ingredient in many commercial insect repellents. The higher the concentration of deet, the longer the repellent activity lasts. Travelers should also be advised to purchase a flying-insect spray containing pyrethrum to use in living and sleeping areas during evening and nighttime hours.

Chemoprophylaxis. Drugs are available to prevent the development of malaria. Malaria chemoprophylaxis should begin one to two weeks

prior to travel to malarious areas. In addition to assuring adequate blood levels of the drug, this allows any potential side effects to be evaluated and treated by the traveler's own physician. Chemoprophylaxis should then continue during travel, and for six weeks after leaving endemic areas.

Several factors should be considered in choosing an appropriate chemoprophylaxis regimen, including the traveler's itinerary and any previous allergic or other reaction to the antimalarial drug of choice.

Because of its record of safety and efficacy, chloroquine phosphate (Aralen®) remains the primary prophylactic drug of choice for travelers to all malarious areas, including areas with chloroquine-resistant P. falciparum (CRPF). In all areas with CRPF, there is malaria caused by one or more other species of Plasmodium that remain sensitive to chloroquine. In addition, chloroquine-sensitive P. falciparum may coexist with chloroquine-resistant parasites within a geographic area.

CDC recommends three alternative treatment regimens, depending upon the type of risk in a given area. The regimen recommended for each country may be found in the CDC publication, Health Information for International Travel 1985. This information is also available from local and district health offices.

Brief descriptions of the three treatment regimens are given below. For complete prescribing information, see Health Information for International Travel 1985 and the current Physicians' Desk Reference.

1. Regimen A. Chloroquine phosphate alone is the drug of choice for travelers to areas of risk where CRPF either has not been reported or where only low-level or focal chloroquine-resistance has been reported. Chloroquine phosphate is usually well-tolerated.

2. Regimen B. For short-term travelers (three weeks or less) to areas of risk of CRPF, the weekly use of chloroquine alone is recommended. In addition, these travelers (except those with histories of sulfonamide intolerance) should be given a single treatment dose of pyrimethamine-sulfadoxine (Fansidar®) to be kept in their possession during travel. They should be advised to take the Fansidar® promptly in the event of a febrile illness, during or after their travel, when professional medical care is not readily available. It must be emphasized that this is only a temporary measure and that prompt medical care is imperative. They should be advised to continue their weekly chloroquine prophylaxis after presumptive treatment with Fansidar®.

   Doxycycline alone taken daily is an alternative to the regimen described above for short-term travel to areas of risk where there is CRPF. It is particularly appropriate for individuals with a history of sulfonamide intolerance.

3. Regimen C. Because persons with prolonged exposure (greater than three weeks) in endemic areas with CRPF are at higher cumulative risk of acquiring malaria, the use of combined weekly prophylaxis with chloroquine and Fansidar® can be considered. Physicians who advise such travelers and expatriate

residents must take into consideration individual living conditions, the availability of local medical care, and when possible, local malaria transmission patterns. The potential benefit of the routine prophylactic use of Fansidar® for these travelers must be weighed against the risk of a possible serious or fatal adverse reaction. If weekly use of Fansidar® is prescribed, the traveler should be cautioned about the possible side effects as described in the section on adverse reaction below.

THE USE OF AMODIAQUINE FOR MALARIA PROPHYLAXIS IS NO LONGER RECOMMENDED BY CDC. This drug was recommended until recently as an alternative for long-term travelers to areas of risk with CRPF. See the section on adverse reactions below.

Adverse Reactions and Contraindications

1. Fansidar®. Fansidar® has been associated with severe adverse cutaneous reactions. Since it became available in the United States in 1982, 21 cases of erythema multiforme, Stevens-Johnson syndrome, and toxic epidermal necrolysis have been documented among American travelers using Fansidar®. The incidence of fatal cutaneous reactions associated with the use of Fansidar® among American travelers ranges from 1/18,000 to 1/26,000 users. None of these serious reactions have been associated with single-dose Fansidar® therapy used in treating malaria. Fansidar® has also been associated with serum-sickness type reactions, urticaria, exfoliative dermatitis, and hepatitis.

   IF THE WEEKLY USE OF FANSIDAR® IS PRESCRIBED, THE TRAVELER SHOULD BE ADVISED TO DISCONTINUE IT IMMEDIATELY IN THE EVENT OF A POSSIBLE ILL EFFECT, ESPECIALLY IF ANY SKIN OR MUCOUS MEMBRANE SIGNS OR SYMPTOMS--SUCH AS ITCHING, REDNESS, RASH, MOUTH OR GENITAL LESIONS, OR SORE THROAT--DEVELOP. The use of Fansidar® is contraindicated in persons with histories of sulfonamide intolerance and in infants under two months of age.

2. Amodiaquine (Camoquine®). Use of amodiaquine for malaria prophylaxis has recently been associated with agranulocytosis. Twenty-five cases have been reported, 23 of them since the beginning of 1985; seven have been fatal. CDC has concluded that any possible prophylactic advantage of amodiaquine is outweighed by the possible risk of agranulocytosis associated with its use. It is, therefore, no longer recommended for malaria prophylaxis.

   OVERDOSE OF ANTIMALARIALS CAN BE FATAL IN CHILDREN. THESE MEDICATIONS SHOULD BE SAFELY STORED IN CHILD-PROOF CONTAINERS OUT OF THE REACH OF CHILDREN.

Additional information regarding malaria prophylaxis and other preventive measures for international travelers is available from the Missouri Department of Health, your district office or your local public health unit. Reprints of references No. 2 and No. 3 below are available free from the Missouri Department of Health, Bureau of Immunization, P.O. Box 570, Jefferson City, MO 65102-0570.

REFERENCES

1. CDC. Health information for international travel, 1985. U.S. Public Health Service, Department of Health and Human Services (publication no. [CDC]85-8280):73-82.
2. CDC. Revised recommendations for preventing malaria in travelers to areas with chloroquine-resistant Plasmodium falciparum. MMWR 1985;34:185-189, 195.
3. CDC. Agranulocytosis associated with the use of amodiaquine for malaria prophylaxis. MMWR 1986;35:165-166.

SURVEY OF READERS

The format and contents of the newsletter have been changed in past months. Please indicate your preference by placing a (1) by first choice; (2) by second choice, etc.

_____ Statistical Disease Reports (Bimonthly insert)

_____ Reprints of MMWR articles

_____ Summary of Investigations

_____ Graphs and Charts Pertaining to Investigations

Comments: _____

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Jefferson City, MO 65102-0570

BUREAU OF RADIOLOGICAL HEALTH

The Missouri Department of Health's Bureau of Radiological Health provides radiation protection services throughout Missouri by registering and inspecting x-ray machines and users of radioactive materials for compliance with state regulations which are not subject to federal licensure. Files are maintained of all x-ray machine registrants and copies of current licenses issued by the U.S. Nuclear Regulatory Commission.

Although a regulatory unit by statutes, the bureau conducts several other activities. These include review of building plans and radiation shielding requirements; inspection of microwave ovens on a request basis;

conduct of radiation safety training for professional, technical and emergency personnel; and provision of consultation and assistance to those who use sources of ionizing radiation. The bureau also responds to radiation emergencies, ranging from relatively minor incidents to those of more serious consequence such as transportation accidents. In the event of an accident at a nuclear power plant, the bureau would have primary responsibility for field monitoring, radiation dose assessment and recommendations for protective actions. The bureau works closely with other state and federal agencies on this issue and participates in annual emergency exercises at Callaway Nuclear Power Plant and Cooper Nuclear Station.

The bureau participates in the Environmental Radiation Ambient Monitoring System. This network is a cooperative program between the U.S. Environmental Protection Agency and state departments of health to provide continuous monitoring of air and precipitation for radioactive contamination. The network received extensive publicity following the recent Russian reactor accident.

In addition, laboratory capabilities for the identification and measurement of radioactive contaminants in environmental samples, both routine and emergency services, are currently under development.

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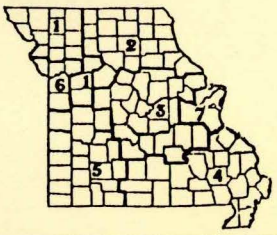

MISSOURI DEPARTMENT OF HEALTH – Epidemiology Services – Communicable Disease Control

BIMONTHLY MORBIDITY REPORT

Reporting Period* January and February , 1986

	DISTRICTS							Kansas City	St. Louis City	St. Louis County	2 Month State Totals		Cumulative		
	1	2	3	4	5	** 6	** 7				1986	1985	for 1986	for 1985	5 Year Median
Vaccine Preventable Dis.															
Chickenpox	55	44	512	516	86	0	6	0	0	0	1219	857	1219	857	
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Influenza	0	3	18	2	8	7	2	4	1	0	45	34	45	34	
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Mumps	0	1	1	0	0	1	0	0	0	0	3	5	3	5	
Pertussis	0	1	0	0	0	0	0	0	1	0	2	3	2	3	
Polio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rubella	0	0	0	0	0	0	0	0	1	0	1	0	1	0	
Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Viral Hepatitis															
A	3	2	2	2	6	1	2	1	0	2	21	17	21	17	
B	8	9	11	4	5	4	1	21	2	11	76	73	76	73	
Non A – Non B	0	0	2	0	0	0	1	0	1	0	4	5	4	5	
Unspecified	0	1	0	0	1	0	0	0	0	0	2	2	2	2	
Meningitis															
Aseptic	0	0	0	0	0	0	0	1	0	1	2	7	2	7	
H. influenza	1	5	2	2	5	6	0	1	5	3	30	16	30	16	
Meningococcal	0	0	4	1	0	1	0	3	0	0	9	9	9	9	
Other	0	1	2	2	3	0	2	8	0	2	20	10	20	10	
Enteric Infections															
Campylobacter	2	0	1	2	6	7	1	3	0	6	28	24	28	24	
Salmonella	4	2	5	8	11	1	6	10	22	2	71	67	71	67	
Shigella	1	0	1	0	0	0	1	5	0	1	9	15	9	15	
Typhoid Fever	0	0	0	0	0	0	0	1	0	0	1	0	1	0	
Parasitic Infections															
Amebiasis	0	0	0	0	0	0	0	1	0	0	1	10	1	10	
Giardiasis	12	1	14	5	6	6	0	10	0	0	54	58	54	58	
Toxoplasmosis	0	0	0	6	0	0	0	0	0	0	6	3	6	3	
Sexually Transmitted Dis.															
AIDS	1	0	0	1	0	0	0	2	2	1	7	2	7	2	
Gonorrhea	51	31	117	78	88	87	41	895	1033	323	2744	2820	2744	2820	
Genital Herpes	6	3	17	5	4	6	7	86	95	69	298	352	298	352	
Nongonococcal urethritis	20	8	41	12	81	39	15	270	462	120	1068	1357	1068	1357	
Primary & secondary syphilis	0	1	0	4	4	0	0	8	4	0	21	11	21	11	
Tuberculosis															
Extrapulmonary	0	0	0	0	3	0	0	0	0	0	3	3	3	3	
Pulmonary	1	2	1	7	5	3	1	5	3	0	28	25	28	25	
Zoonotic															
Animal Bites	4	5	10	13	5	11	10	0	0	0	58	15	58	15	
Psittacosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rabies (Animal)	0	2	1	3	1	0	0	0	0	1	8	6	8	6	
Rocky Mtn. Spotted Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Tularemia	0	0	2	0	1	0	0	0	0	0	3	5	3	5	

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious) – 1
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease – 1
Legionnellosis – 2
Leptospirosis
Lymphogranuloma Venereum
Malaria
Plague
Rabies (human)
Reye's Syndrome – 2
Toxic-Shock Syndrome – 4
Trichinosis

Outbreaks

Foodborne/waterborne
Histoplasmosis
Nosocomial
Pediculosis
Scabies – 2
Other – 1

*Reporting Period Beginning Dec 29, Ending Feb 28.

**Totals do not include KC, SLC, or SLCo.

Due to data editing, totals may change.

Missouri EPIDEMIOLOGIST

Volume 8, Number 3 May-June 1986

INSIDE THIS ISSUE:
Immunization of Hospital Employees; Tuberculosis Therapy; Community Right-to-Know; Retail Food Store Rule; Reporting Communicable Diseases

IMMUNIZATION OF HOSPITAL EMPLOYEES

The risk of contracting and transmitting certain communicable diseases may be higher for hospital employees than for the general public. Besides the discomfort and sometimes tragic complications of disease, outbreaks in health care facilities can disrupt hospital or office routines and cause considerable expense. The special status of health care workers has been acknowledged in formulating recommendations for disease prevention through the use of vaccines. The Immunization Practices Advisory Committee (ACIP) of the U. S. Public Health Service recommends that health care workers be immune to measles and rubella. Hepatitis B and influenza vaccines are recommended for designated groups of health care workers. The American Hospital Association also recommends rubella immunity for hospital employees.

The Missouri Department of Health recently surveyed Missouri hospitals to determine how these recommendations have been incorporated into hospital policies. A total of 175 hospitals were contacted in 1985, and all provided information. Survey results indicate that the number of hospitals with immunization policies is disappointingly low. Specific ACIP recommendations for each vaccine are given below, with pertinent survey results.

Rubella. To prevent rubella transmission in medical settings, the ACIP recommends immunity for all medical, dental, laboratory, and other support personnel--both male and female--who might be at risk of exposure to patients with rubella or who might have contact with pregnant patients. Rubella vaccine is recommended for all such personnel unless they have either proof of vaccination on or after the first birthday or laboratory evidence of immunity.

Only 45 Missouri hospitals (26%) require proof of rubella immunity for any of their employees. An additional 31 hospitals (18%) recommend immunity, and seven (4%) have education programs only. Another seven (4%) request immunization histories but do not actively recommend or require immunity. The remaining 85 hospitals (49%) have no rubella policies.

Measles. The ACIP recommends immunity for all health care personnel born in 1957 or later who may have contact with patients infected with measles. Measles vaccine is recommended for any person in this age group who lacks documentation of either 1) immunization with live-virus vaccine on or after the first birthday, 2) physician-diagnosed measles, or 3) laboratory evidence of immunity. Adults born before 1957 can be considered immune to measles since measles was a universal infection before the availability of vaccine.

Very few hospitals in Missouri have policies on measles immunity. Only five hospitals (3%) actually require immunity for any of their employees and 11 (6%) recommend it. Four (2%) have education programs only, and two (1%) request immunization histories. The remaining 153 hospitals (87%) have no measles policies.

Hepatitis B. The ACIP states that medical, dental, laboratory, and other support personnel who may have contact with blood or blood products should be immune to hepatitis B virus (HBV) infection. The groups at highest risk for acquiring HBV infection and for whom the vaccine is recommended include medical technicians; operating room staff; phlebotomists; physicians (particularly surgeons and pathologists); nurses and dentists (particularly oral surgeons); laboratory and blood-bank technicians; and emergency room staff.

Ninety-three Missouri hospitals (53%) recommend HB vaccine for high-risk employees. An additional 11 (6%) actually require it for specified groups of employees. Twelve hospitals (7%) provide education or screening without actively recommending vaccination. The remaining 59 hospitals (34%) have no policies on hepatitis B immunization.

Influenza. The ACIP recommends that physicians, nurses and other personnel who have extensive contact with high-risk patients (such as primary-care and certain specialty clinicians and staff of intensive-care units) receive influenza vaccination annually. This recommendation is made to reduce the possibility for nosocomial spread of influenza to high-risk patients.

Only one hospital in Missouri requires influenza immunization for certain personnel. Ninety-three hospitals (53%) recommend it, and 70 (40%) have no influenza policies. The remaining 6% make vaccine available to employees but do not have policies recommending it. Altogether, 100 hospitals (63%) provide influenza vaccine at the hospital for employees.

The results of the 1985 survey closely parallel a similar survey completed in 1984, indicating that little progress has been made in the last year. Larger hospitals are more likely to have immunization policies for rubella and hepatitis B. Only 31% of hospitals with 200 or more beds lack rubella policies, compared with 74% of those with fewer than 50 beds. Similarly, only 15% of the larger hospitals lack hepatitis B policies, compared with 59% of the small hospitals. Differences for measles and influenza were much smaller.

Outbreaks of vaccine-preventable disease can and do occur in hospitals. During the period 1980-84, 241 persons in 30 states acquired measles in medical facilities. Several hospital rubella outbreaks occurred during the same period, most notably in California, where a 1982 outbreak involved 16 hospitals and resulted in at least two therapeutic abortions. A significant proportion of hospital employees, particularly those under 30, remain susceptible to these diseases. Many in high-risk occupations are not protected against hepatitis B. Implementation and enforcement of hospital policies requiring immunity to these diseases is the only way to prevent hospital-related outbreaks in Missouri.

REFERENCES

1. ACIP. Adult immunization. MMWR 1984;33:Supplement 1.
2. CDC. Rubella in hospitals--California. MMWR 1983;32:37-39.
3. Davis RM, Orenstein WA, Frank JA, Sacks JJ, Dales LG, Preblud SR, Bart KJ, Williams NM, Hinman AR. Transmission of measles in medical settings, 1980-1984. JAMA 1986;255:1295-1298.

TUBERCULOSIS THERAPY

In a recent editorial of the American Review of Respiratory Disease (1985:131:809-810), Doctors Dixie Snider and Laurence Farer addressed issues raised by package inserts for antituberculosis drugs and antigens. This article is directed to the confusion that may arise from discrepancies between program recommendations and the manufactures' package inserts. This editorial is reprinted in its entirety. The writers address the manufacturers' approach to the labeling of drugs and antigens--an approach which may stem from a defensive posture due to legitimate concern over product liability litigation.

Until the Food and Drug Administration (FDA) reviews these concerns, practitioners in Missouri should be reminded that other sources of product information are readily available. In addition to the statements published by the American Thoracic Society and the Centers for Disease Control, information can be obtained by contacting the Missouri Department of Health's Bureau of Tuberculosis Control at 314/751-8214. Consultation can also be arranged with the Bureau's consultant pharmacist.

Editorial

Centers for Disease Control
Atlanta, GA 30333

Package Inserts for Antituberculosis Drugs and Tuberculins[1]

In 1982, the Food and Drug Administration (FDA) issued a statement on the use of approved drugs for unlabeled indications (1), a portion of which reads as follows:

"Valid new uses for drugs already on the market are often first discovered through serendipitous observations and therapeutic innovations, subsequently confirmed by well-planned and executed clinical investigations. Before such advances can be added to the approved labeling, however, data substantiating the effectiveness of a new use or regimen must be submitted by the manufacturer to FDA for evaluation. This may take time and, without the initiative of the drug manufacturer whose product is involved, may never occur."

In a recent editorial, Dr. John Archer pointed out that the FDA cannot approve or disapprove of how a legally marketed drug is *used* (2). The agency only approves what the manufacturer may *recommend* about uses in its labeling (package insert) and advertising. Dr. Archer goes on to give several examples of valid uses of drugs that are not included in the manufacturers' labeling.

This situation certainly applies to labeling for antituberculosis drugs. Two examples quickly come to mind:

1. Virtually all pulmonary and infectious disease experts would recommend the use of antituberculosis drugs for treatment of nontuberculous mycobacterial infections. However, there is no mention of such use in the package inserts for antituberculosis drugs.

2. The package inserts for several drugs used for treatment of tuberculosis in children do not mention the use of the drug in children, nor do they provide information on appropriate drug dosages in children.

There are probably a number of reasons why some valid uses of marketed drugs are never reflected in the labeling, but the lack of financial incentive is perhaps the most important. For example, there is little financial incentive to pursue the approval to advertise a drug for uncommon medical problems, such as certain nontuberculous mycobacterial diseases or childhood tuberculosis. There is also little or no incentive for the manufacturer to recommend using smaller quantities of a drug than originally recommended as, for example, in twice-weekly administration of antituberculosis drugs. Numerous clinical trials have confirmed the efficacy and safety of twice-weekly administration of isoniazid, rifampin, streptomycin, ethambutol, and pyrazinamide (3). The option of using twice-weekly therapy and appropriate doses is not mentioned in the package inserts for any of the 5 drugs. In fact, the package insert for rifampin specifically states that the drug is *not* recommended for intermittent therapy.

Some other problems with the package inserts for antituberculosis drugs are:

1. The insert for isoniazid recommends routine ophthalmologic examinations for patients taking the drug. We are unaware of any studies that have shown visual toxicity to be a common problem with isoniazid administration.

2. Package inserts mention the known interactions between rifampin and methadone, oral hypoglycemic agents, corticosteroids, dapsone, oral contraceptives, digitalis preparations, and para-aminosalicylic acid. However, no mention is made of the reported interaction of rifampin with warfarin, barbiturates, diazepam, and quinidine (4-7).

3. The package insert for pyrazinamide states that the drug should be given only to hospitalized patients, but numerous trials have demonstrated the safety and efficacy of the drug when given on an outpatient basis.

Readers can probably add other items to this list.

A related problem is in the labeling of PPD, tuberculin. The current labeling points out that animal reproduction studies have not been conducted with PPD, tuberculin and that it is also not known whether PPD, tuberculin can cause fetal harm when administered to a pregnant woman or can affect the reproduction capacity. The labeling states that PPD, tuberculin should be administered to pregnant women only if clearly needed.

Because of this labeling, FDA and the Centers for Disease Control have had inquiries regarding the risk of fetal harm from tuberculin testing pregnant women. Many who read the package insert are under the false impression that tuberculin testing of pregnant women is contraindicated and some have discontinued tuberculin testing pregnant women in high-risk populations (e.g., Indochinese refugees) for whom testing is indicated. We have been unable to find any evidence in the literature that fetal harm can result from a tuberculin test, despite the fact that many thousands (perhaps millions) of pregnant women have been skin tested over the years. The theoretical risk of fetal harm from a tuberculin test would seem to be extremely low.

Another problem with drug labeling that has been brought to our attention is that the labeling for Searle oral contraceptives indicates that isoniazid may render them less effective and increase the risk of breakthrough bleeding. Rifampin has been known to do this for years (8), but we are unaware of any published evidence that isoniazid can do so. The inclusion of isoniazid in this insert apparently is a result of a case report received by the company of a patient on an oral contraceptive who became pregant while taking *both isoniazid and rifampin* for treatment of tuberculosis. Under the circumstances, we see no reason to implicate isoniazid as the cause of contraceptive failure.

These latter two labeling problems may, at least in part, be a result of the manufacturers' legitimate concerns about product liability suits.

The FDA is aware of our concerns and plans a thorough review of the labeling within the next year (Tabor E, personal communication, October 31, 1984). At present, however, physicians must recognize that as a source of information about proper drug use, product labeling has its limitations. Fortunately, there are other sources of information readily available. For example, the American Thoracic Society/Centers for Disease Control (ATS/CDC) have published their recommendations on the use of antituberculosis drugs and tuberculin (9, 10), and copies are available from most lung associations. These statements are periodically updated to reflect current expert opinion. The American College of Chest Physicians has also recently published its recommendations (11). When read in conjunction with the package inserts, these statements provide the physician with more complete information of the proper use of antituberculosis drugs and tuberculin.

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MISSOURI DEPARTMENT OF HEALTH – Epidemiology Services – Communicable Disease Control

BIMONTHLY MORBIDITY REPORT

Reporting Period* March and April , 19 86

	DISTRICTS										2 Month State Totals		Cumulative		
	1	2	3	4	5	** 6	** 7	Kansas City	St. Louis City	St. Louis County	1986	1985	for 1986	for 1985	5 Year Median
Vaccine Preventable Dis.															
Chickenpox	129	40	938	776	96	16	9	10	1	9	2024	898	3243	1755	
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Influenza	0	3	6	2	3	1	0	2	1	6	24	25	69	59	
Measles	0	0	2	0	2	0	0	0	1	0	5	2	5	2	
Mumps	1	0	2	0	0	0	2	0	0	0	5	2	9	7	
Pertussis	0	0	2	0	0	0	0	0	0	0	2	6	4	9	
Polio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rubella	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Viral Hepatitis															
A	3	1	3	0	11	2	0	2	2	4	28	28	49	45	
B	4	1	17	3	8	4	1	23	6	14	81	63	157	136	
Non A – Non B	0	1	1	0	0	0	0	1	2	4	9	8	12	13	
Unspecified	0	2	0	0	1	1	1	1	0	0	6	3	8	5	
Meningitis															
Aseptic	0	0	0	1	0	1	2	3	0	5	12	7	14	14	
H. influenza	3	3	1	2	4	5	3	5	7	1	34	21	64	37	
Meningococcal	1	1	1	0	1	3	0	2	3	0	12	10	21	19	
Other	0	2	3	3	3	1	2	5	4	3	26	14	46	24	
Enteric Infections															
Campylobacter	1	0	0	0	6	1	4	1	0	12	25	33	53	57	
Salmonella	2	1	10	6	7	2	6	19	16	9	78	78	149	145	
Shigella	1	0	0	1	0	1	0	0	4	0	7	14	16	29	
Typhoid Fever	0	0	0	0	0	0	1	0	1	0	2	0	3	0	
Parasitic Infections															
Amebiasis	1	0	1	2	0	0	0	1	0	0	5	4	6	14	
Giardiasis	7	0	20	2	7	5	2	9	0	7	59	45	113	103	
Toxoplasmosis	0	0	0	2	1	1	1	0	0	1	6	1	12	4	
Sexually Transmitted Dis.															
AIDS	0	0	0	2	0	1	0	2	3	0	8	9	17	11	
Gonorrhea	63	26	108	89	161	104	32	885	1194	356	3018	3189	5762	6009	
Genital Herpes	2	1	40	4	4	11	5	68	82	53	270	243	568	595	
Nongonococcal urethritis	14	2	39	11	96	29	13	324	622	193	1343	1321	2411	2678	
Primary & secondary syphilis	0	0	0	4	1	0	0	12	3	1	21	20	42	31	
Tuberculosis															
Extrapulmonary	0	1	1	1	3	1	2	0	5	6	20	9	23	12	
Pulmonary	1	1	3	9	5	3	3	6	8	7	46	40	74	65	
Zoonotic															
Animal Bites	1	22	40	40	16	49	28	0	2	0	198	16	256	31	
Psittacosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rabies (Animal)	0	0	3	11	1	0	0	0	0	0	15	11	23	17	
Rocky Mtn. Spotted Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Tularemia	0	0	0	1	0	0	0	1	0	0	2	0	5	5	

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease – 3
Legionnellosis – 3
Leptospirosis– 1
Lymphogranuloma Venereum
Malaria – 2
Plague
Rabies (human)
Reye's Syndrome
Toxic-Shock Syndrome
Trichinosis

Outbreaks

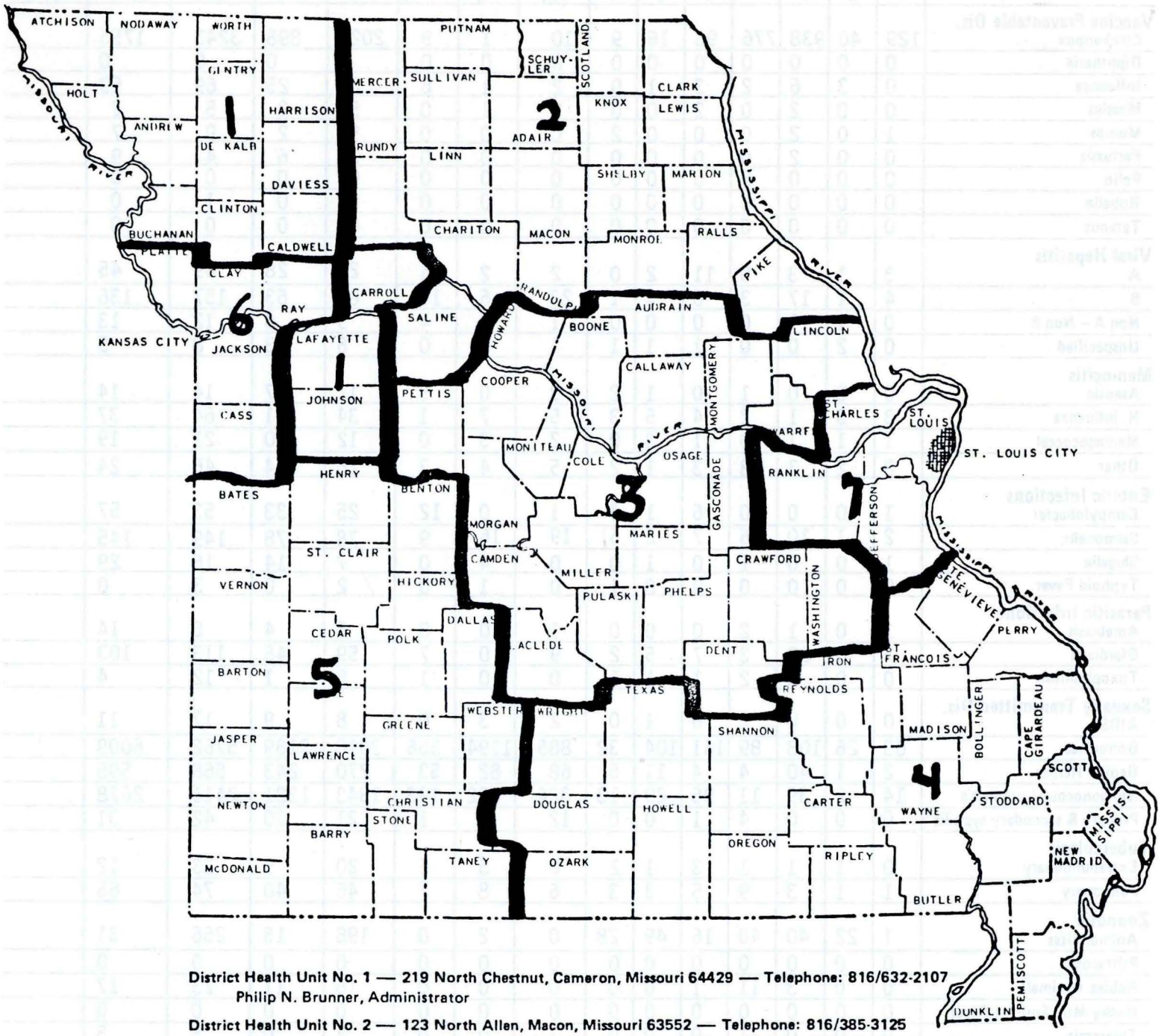
Foodborne/waterborne – 2
Histoplasmosis
Nosocomial
Pediculosis
Scabies – 1
Other

*Reporting Period Beginning Mar. 2, Ending May 3.

**Totals do not include KC, SLC, or SLCo.

Due to data editing, totals may change.

MISSOURI DEPARTMENT OF HEALTH



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COMMUNITY RIGHT TO KNOW

The "Community Right to Know" (CRTK) law was passed by the 83rd General Assembly in 1985. The purpose of the law is to allow each community to know what toxic substances local businesses use or produce. Under the law, most Missouri employers are required to provide information on toxic substances they use or produce to their local fire departments and to the Missouri Department of Health (DOH). The only exceptions are agricultural employers with 10 or less employees and retail stores which only sell toxic substances. When a citizen wants to know what hazardous chemicals are in his or her community that citizen can access the information (for a small charge) at the Department of Health or the local fire department. The law defines toxic substances as those substances on "the Z list" of the Occupational Safety and Health Administration (OSHA) and the Threshold Limit Value (TLV) list of the American Governmental Industrial Hygienists. Currently, there are some 670 different chemicals on these two lists.

Employers can comply with CRTK by supplying information on the health effects, first aid treatment, physical characteristics, and clean-up procedures for toxic substances they use or produce. Submission of an OSHA-approved material safety data sheet (MSDS) to the local fire department and the DOH will satisfy this requirement.

When CRTK becomes operational in early 1987, physicians and other medical personnel can, in an emergency, access the information regarding an employer's toxic substances by calling the DOH Bureau of Environmental Epidemiology at (314) 751-8209 or their local fire department. The Bureau of Environmental Epidemiology has access to more detailed information on toxic substances than that supplied by employers, and this can be provided to physicians also. In non-emergency situations, anyone can access information on the toxic substances used or produced by a company by making a written request to the Missouri Department of Health, Bureau of Environmental Epidemiology, P.O. Box 570, Jefferson City, MO 65102-0570 or to the local fire department. Under the CRTK law, affected employers will be notified of all requests for information and can obtain the name of the requester if desired.

The CRTK law is different in purpose from the OSHA employee right-to-know regulation (OSHA Hazard Communication--29 CFR 1910.1200). CRTK is not pre-empted in any way by the OSHA program which requires covered employers to inform and train their employees about the toxic substances they handle. The OSHA program also has specific labeling requirements. The OSHA and Missouri programs do have two areas in common: both require the same information to be provided, and both handle trade secret claims in the same manner. Under both programs, a company can protect its trade secrets by asking that chemical identifier information be withheld. Information on health effects, first aid, and clean-up procedures will be provided to an employee or community unless an employer can provide substantial proof that these data will compromise a trade secret.

The Missouri Community Right to Know law [Sections 292.600-292.620, RSMO (Supp. 1985)] will become effective Sept. 30, 1986. Those Missouri employers who must also comply with the OSHA right-to-know regulations must submit information on their toxic substances to the Department of Health and their local fire departments by Dec. 31, 1986. All other covered employers have until Sept. 30, 1987 to submit information. The Department of Health is currently writing the rules for CRTK and preparing to handle some 500,000 material safety data sheets that will be submitted. Anyone desiring a copy of the law and/or rules or other information should write to Terry Hopper at the Bureau of Environmental Epidemiology.

RETAIL FOOD STORE RULE

The Missouri Department of Health recently received new regulatory tools to evaluate sanitation compliance in retail food stores. These tools are found in the requirements of Rule 19CSR 20-1.020.

Prior to the adoption of this new rule in late April, retail food stores were regulated under Missouri's "Food and Drug Law," sections 196.010-196.271 (RSMo 1978). These laws are general in nature and do not give sanitation standards for equipment or buildings used in retail food sales.

The new rule is patterned after the 1982 Retail Food Store Sanitation Code developed jointly by the Association of Food & Drug Officials and the Food and Drug Administration. Although some changes were made to accept new technology and Missouri's rulewriting requirements, the inspection report form remains the same for both the Federal Code and the Missouri Rules.

The new rule addresses 44 different public items which are divided into 15 areas such as food protection, personnel, water, and sewage, along with insect, rodent and animal control. The items are weighted according to public health significance with the most significant items counting as four and five point violations and items of lesser significance counting as one and two point violations.

The establishments will be scored on the basis of percentages with 90-100 percent considered excellent; 80-89 percent, good; 70-79 percent, satisfactory; 60-69 percent, marginal; and 59 and below, inadequate.

Both the industry and environmental sanitarians will benefit from the more defined standards established by the rule. The industry will have definite standards for future construction and should be able to prevent some sanitation problems from occurring.

The rule was developed with initial input from the industry; therefore, little comment was received during the comment period. The rule is estimated to have a one time cost of $500 each to 1,707 establishments for the addition of a handwashing sink in the food preparation areas, a mop sink and an approved refuse storage area for a total cost of $853,500.

REPORTING COMMUNICABLE DISEASES

19 CSR 20-20.020 Reporting Communicable Diseases

PURPOSE: This rule designates the diseases, disabilities and conditions that must be reported to the Department of Health. It also establishes when they must be reported.

(1) Category I diseases must be reported to the Department of Health or to the local health authority within twenty-four (24) hours of suspected diagnosis by telephone, telegraph or other rapid communication, followed by a written report within seven (7) days. Category I diseases are: Animal bites; Botulism; Chlamydia trachomatis infections; Diphtheria; Epidemics -- foodborne, toxic substances and others; Gonorrhea; Measles; Meningitis, Haemophilus influenzae; Meningitis, Meningococcal; Poliomyelitis; Rabies; Rubella; Syphilis and Typhoid Fever.

(2) Category II diseases must be reported to the Department of Health or to the local health authority in writing within seven (7) days of suspected or established diagnosis. Category II diseases are:

Acquired immune deficiency syndrome (AIDS);
Amebiasis;
Anthrax;
Brucellosis;
Campylobacter infections;
Chancroid;
Chickenpox
Cholera;
Encephalitis, infectious;
Encephalitis, viral;
Genital herpes;
Giardiasis;
Granuloma inquinale;
Hepatitis A, B, and non-A, non-B;
Histoplasmosis outbreaks;
Influenza outbreaks;
Kawasaki disease;
Legionellosis;
Leptospirosis;
Lymphogranuloma venereum
Malaria;
Meningitis, aseptic;
Mumps;
Nongonococcal urethritis;
Nosocomial outbreaks;
Pediculosis outbreaks;
Pertussis;
Plague;
Psittacosis;
Reye's syndrome;
Rocky Mountain spotted fever;
Salmonella infections
Scabies outbreaks;
Shigella infections;
Tetanus;
Toxic shock syndrome;
Trichinosis;
Tuberculosis
Tularemia

(3) Diseases and illnesses resulting from exposure to a toxic substance or to a radioactive substance that are indicative of an occupational health, public health or environmental problem must be reported to the Department of Health or the local health authority. If such a disease or illness is verified or suspected and presents an emergency or serious threat to public health or safety, that report shall be made by telephone, telegraph or other rapid communication followed by a written report. Diseases or illnesses resulting from exposure to toxic substances that must be reported include, but are not limited to, the following; occupational lung disease including silicosis, asbestosis and byssinosis; occupationally-related cancers including mesothelioma; and illnesses or diseases related to pesticide poisoning.

(4) The occurrence of epidemics or outbreaks of any illness or disease which may be of public health concern shall be reported to the Department of Health or the local health authority by telephone, telegraph or other rapid communication within twenty-four (24) hours of suspected diagnosis followed by a written report within seven (7) days.

(5) A physician attending any person who is suffering from any disease or condition listed in sections (1) through (4) of this rule or who is suspected of having any of those diseases or conditions, or who is suspected of being a carrier of any of those diseases or conditions shall report to the Department of Health or the local health authority that person's name, address, age, sex, race, name of disease or condition diagnosed or suspected and the date of onset of the illness.

(A) A physician attending any patient, with any disease or condition listed in sections (1) through (4) of this rule, who is in a hospital, clinic or other private or public institution may authorize, in writing, the administrator, superintendent or the person in charge of the hospital, clinic or institution to submit reports of communicable diseases on patients attended by the physician at the hospital, clinic or institution. But under no other circumstances shall the physician be relieved of this reporting responsibility. Each report shall include the name, age, sex, race and the address of the patient, the disease diagnosed or suspected, the date of onset of illness, and whether the patient is hospitalized. If the patient is hospitalized, the name and address of

the hospital, date of the report, the name and address of the attending physician, and any appropriate laboratory results must be included in the report.

(B) A physician's report of epidemics as required in section (4) of this rule shall include the diagnosis or principal symptoms, the approximate number of cases, the local health authority jurisdiction within which the cases occurred and the name and address of the reporting physician.

(6) Any person in charge of a public or private school, summer camp or day care center shall report immediately to the local health authority the presence or suspected presence of any diseases listed in sections (1) through (4) of this rule.

(7) All local health authorities shall forward to the Department of Health reports of all diseases listed in sections (1) through (4) of this rule. Any report shall be forwarded within twenty-four (24) hours after it is received, according to procedures established by the Department of Health director. A local health authority shall transcribe from any original report the information necessary to carry out the required duties in 19 CSR 20-20.020(2),(3) and (3)(A).

(8) All individual morbidity reports received by a local health authority or the Department of Health are to be considered confidential records and not public records.

Auth: section 192.020, RSMo(1978). Original rule filed July 15, 1948, effective Sept. 13, 1948.Amended: Filed Sept. 1, 1981, effective Dec. 11, 1981. Rescinded and readopted: Filed Nov. 23, 1982, effective March 11, 1983. Emergency amendment filed June 10, 1983, effective June 20, 1983, expired Sept. 10, 1983. Amended: Filed June 10, 1983, effective Sept. 11, 1983. Amended: Filed Nov.4, 1985. Effective March 24, 1986.

Reports of diseases should be made by contacting your local health department or Bureau of Communicable Diseases, P.O. Box 570, Jefferson City, MO 65102-0570, Phone (314) 751-8127, toll free (800) 392-0272.

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Missouri EPIDEMIOLOGIST

Vol. VIII, No. 4 *July / August 1986*

DOH confirms leukemia cluster in St. Charles County; no link found between cluster and Weldon Spring site

INTRODUCTION

In 1980, several educators and physicians from the St. Charles and St. Louis area noticed what they perceived to be an excess of leukemia in children in St. Charles County. With the help of the records departments of Cardinal Glennon and St. Louis Children's hospitals in St. Louis and St. Joseph Medical Center in St. Charles, case information was collected and sent to the Centers for Disease Control (CDC) in Atlanta. In their communication with CDC, the St. Charles group expressed concern about the possible association of these cancers with radioactive waste material stored at a site near Weldon Spring. The site is located in southwest St. Charles County about 30 miles west of St. Louis.

The Centers for Disease Control concluded that there was not enough evidence to confirm or deny the existence of a cluster and referred the situation to the Missouri Division of Health (DOH) in 1982.

A uranium processing plant operated at Weldon Spring from 1957 to 1966 and left four sites containing radioactive waste next to the plant. There is evidence of off-site migration of small amounts of this waste from sampling of nearby lakes done by the Department of Conservation. There is no evidence of contamination of nearby private wells in recent surveys by the Department of Health. About five miles from the old plant site is a quarry where radioactive waste was dumped. The quarry is located within one mile of the well field of the St. Charles County System, which supplies water to about 50,000 county residents. There is no evidence of pollution of the water supply either from the quarry or from the plant area.[1-8] Attempts at remedial action at the uranium processing plant took place during 1968-1969. These included decontamination of two buildings, moving 4,600 m3 of contaminated materials to the nearby quarry, and shipment of leftover uranium oxide and contaminated scrap to other Atomic Energy Commission facilities.

An extensive review of cancer mortality for the period 1970- 1982 was done for St. Charles County by the DOH's Cancer Control Program.[9] The study examined data for each cancer site, both age- adjusted and age-specific, for each zip code and each city or town in the county. The study revealed no significant excess of cancer for any site for any specific age group or any geographic sub-unit within the county. The overall cancer mortality rate for the county was slightly below that expected for the state. These results met with less than full acceptance when announced in March of 1983.

In response to the DOH study, a local citizens' group collected information on cancer in children for 1974-1982 and submitted it to DOH for evaluation. As a companion to this incidence analysis, mortality data were reviewed by DOH for the same time period. The incidence data revealed no significant excess (15 observed versus 13 expected).[10] The mortality analysis for the same period (1974-1982) revealed a statistically significant 13 deaths due to leukemia in children age 14 and under, while six were expected.[10] Based on the mortality results for 1974-1982, DOH decided to do an incidence study of pediatric leukemia in St. Charles County for 1970-1983. Because of considerable concern by some area physicians, melanoma and bladder cancer cases were also identified. The numbers of observed cases for melanoma and bladder cancer were below those expected.

(continued on page 2)

IN THIS ISSUE...

METHODS AND MATERIALS

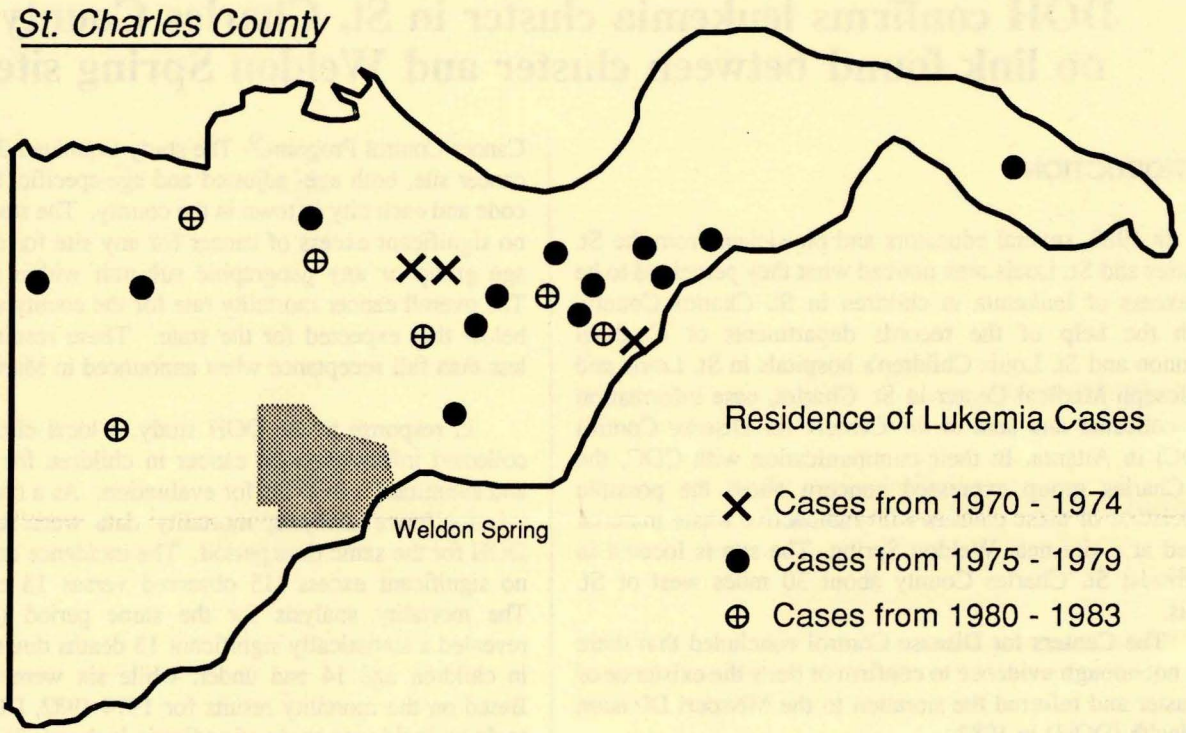
The incidence for pediatric leukemia for the period 1970-1983 was determined by a search of the records of those area hospitals known to be utilized by St. Charles County residents.[11] These hospitals were contacted and arrangements made for accessing their records. Possible cases were identified using hospital-maintained diagnostic indices stored either on computer or on paper. Once potential cases were identified, the appropriate medical records were requested and abstracted to determine if case definitions were met.

Individual patients and/or their relatives were located and interviewed to obtain data on occupation, residence, and lifestyle. Information on cases confirmed as meeting study criteria was forwarded to the Cancer Control Program for data entry. Leukemia cases were grouped according to the classifications of Cline and Haskett.[12] Results obtained were compared to expected figures from National SEER (Surveillance Epidemiology and End Results Program)[13] data for white children age 14 and under using the Chi square test for significance ($p = 0.05$).

RESULTS

Twenty-two cases of leukemia in St. Charles County children (age 14 and under) were observed for 1970-1983 (expected = 20.0, not significant). However, for 1975 through 1979, the 13 observed cases significantly exceeded the seven expected. Six cases were diagnosed in 1979. Fewer cases than expected were observed for 1970-1974 (3 observed, 6.6 expected) and for 1980-1983 (6 observed, 6.4 expected). Eighteen of the 22 cases were acute lymphocytic leukemia, while the other four were acute nonlymphocytic leukemia.

Each case was located by residence in the 1980 census tracts for St. Charles County. There was no significant difference between observed and expected for any census tract in the county. Seventeen of the 22 leukemia cases lived at residences which were on public water supplies. Four had private wells. One obtained water from a private supply (five years) and a public supply (four years) prior to diagnosis. Four cases obtained their public drinking water from the St. Charles County Water District 2. Their wells



are approximately one mile from a quarry that contains radioactive waste. The other 15 obtained their drinking water from four different public supplies, none of which is near known radiation sources.

Twelve of the 22 fathers had office/managerial type jobs, while the other 10 were manual/skilled workers. Only one of the 22 had a job (painter) where benzene exposure was probable. Seventeen of the mothers listed their occupation as housewives. Only one of the remaining five had a job (nurse) with probable exposure to carcinogens.

DISCUSSION

Recent reviews indicate that incidence of leukemia is linked to several types of radiation, benzene, and unidentified viral agents.[14-16] There appears to be a strong association between leukemia and gamma or x-rays.[14,15] Pre- and postnatal exposure to x-rays has been linked to leukemia in children.[15] High levels of radium and radon in drinking water have been tentatively correlated with leukemia.[17,18] Occupational exposure to benzene appears to result in an

increased incidence of leukemia.[15] Viral agents are known to cause leukemia in many animal species and, for the T-cell subtype, in man.[15] Clustering of leukemia in children by space and time has been suggested as circumstantial evidence for viral leukemogens.[14-16,19]

This evaluation of childhood leukemia incidence in St. Charles County indicates that a cluster of cases occurred in the time period 1975-1979. However, the results indicate that incidence returned to expected levels for 1980-1983. There does not appear to be any evidence for clustering in any specific geographic region of St. Charles County. There was little evidence of viral transmission mechanisms such as case contact, occurrence of infectious disease, and receiving transfusions prior to diagnosis. Only one parent had an occupation where significant benzene exposure was probable. There was no evidence to link these leukemia cases to pre- or post-natal x-ray exposure. There was also little likelihood of a water-borne agent, since the 22 cases obtained drinking water from nine different sources.

Dose estimates of exposure to radiation from the Weldon Spring Uranium Processing plant and associated waste sites were recently made.[20] Ingestion of water and fish, inhalation, and external radiation pathways were examined using available environmental monitoring data.[1-8] This information was available for 1960-1966 and 1974-1984 and included both on- and off-site data on gross alpha, beta, and gamma radiation; radium-226 & 228, uranium, and radon. The types of data collected are variable especially for the period when the plant was open.[20]

CONCLUSION

The above data indicate that radiation from the Weldon Spring radioactive waste sites was not high enough to cause the leukemia cases reported here. There were not sufficient offsite doses to cause other health effects for any individual. There are no monitoring data for the period during which remedial action was done in 1968-1969. The maximum dose from this remedial work has been hypothetically estimated to be 0.2 mrem/year.[20]

This study did not find the cause of the leukemia excess in 1975-1979 in St. Charles County. It does present evidence indicating that neither radiation from Weldon Spring, viral agents, nor benzene were the cause of this reported cluster. Some investigators have proposed that some of the many leukemia clusters reported in children are simply random occurrences.[19]

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Tests for Lyme Disease, RMSF, RSV, Toxoplasmosis added

The State Public Health Laboratory (SPHL) has made several changes over the past few months in the services it provides. Test services for Lyme Disease, Rocky Mountain Spotted Fever (RMSF) and a new test for respiratory syncytial virus (RSV) have been added. In addition, the testing for toxoplasmosis from the SPHL Serology Unit has been transferred to the Virology Unit.

Serologic Tests for Lyme Disease, Rocky Mountain Spotted Fever

The SPHL has begun offering serologic tests for Lyme Disease and RMSF. Both diseases commonly appear in the summer months, as people pursue outdoor recreational activities, and ticks are in the feeding phase of their life cycle. Both diseases, if left untreated, can result in serious illness, and RMSF may be fatal.

For many years, the SPHL offered a complement fixation (CF) test for RMSF. However, reagents for the tests became unavailable as CF testing was replaced with newer, more rapid tests. The SPHL was finally forced to refer specimens for RMSF to the Centers for Disease Control in Atlanta, Georgia, a procedure which often resulted in delayed test reports. The test now used for RMSF is an indirect fluorescent antibody test. Reagents for this test are available, and the SPHL recently has evaluated the procedure and found it to be reliable and accurate, allowing the SPHL to once again offer this service.

Most cases of Lyme Disease have been reported in the northeast and north central regions of the United States. However, some cases have been reported in Tennessee, Arkansas and Texas. Missouri has two of the four tick species that are suspected or associated with transmission of the causative agent, *Borrelia burgdorferi*. The serologic test is being offered to determine if Lyme Disease is present in Missouri and, if so, its prevalence.

Respiratory Syncytial Virus (RSV), *Bordetella pertussis* testing

Respiratory syncytial virus (RSV) is the major viral pathogen of the respiratory tract in children less than 2 years of age. Its symptoms closely resemble those of *B. pertussis* infection, which makes differential diagnosis difficult.

Until recently, identification of RSV could be accomplished by culture or serologic testing. Neither method is especially useful in acute clinical situations where it is critical to determine the nature of the infection in a relatively short period of time for proper treatment and clinical management. The SPHL has acquired the capability to identify RSV infections from throat swabs by an enzyme immunoassay procedure which is rapid and does not depend on the presence of viable virus. Coupled with the services for *B. pertussis* infections, the SPHL is providing these services especially to those health care facilities that do not have the laboratory capability to assist with the diagnosis of these disease agents. This project will be evaluated after one year to determine its usefulness to the medical community and its relevance as a legitimate public health service.

Virology Unit now testing for Toxoplasmosis

Most requests for toxoplasmosis serology are made as part of early prenatal care and are often accompanied by requests for rubella screening, cytomegalovirus and herpes testing (the TORCH battery). The test most commonly used for toxoplasmosis was an indirect fluorescent antibody (IFA) test performed in the SPHL Serology Unit. The remaining tests were performed in the Virology Unit. Reporting of results on the sample were made by two units, a situation that occasionalyy leads to confusion, and delays in reporting.

The Virology Unit has, in the past year, gone to flurescent immunoassary (FIA) techniques for some of its serology testing. The SPHL has evaluated this procedure and determined that it is comparable, in terms of accuracy and precision, to the IFA test. The SPHL has decided to transfer toxoplasmosis testing to the Virology Unit to provide a more orderly and efficient service.

The only significant change is that reports will not have titres. Results from FIA tests are reported in units of fluorescence, and though titres may be calculated from the intensity of fluorescence, interpretation of calculated FIA titres is somewhat different than the interpretation of standard serologic dilutions. Therefore, FIA reports will provide the interpreation of the test result, but the actual units of fluorescence or calculated titres will not be shown to avoid confusion. The test interpretations are based on the control values and manufacturer's instructions.

Further information may be obtained by contacting the State Public Health Laboratory at 314/751-3334. ■

Dr. Ross Brownson joins Cancer Control Program

Ross Brownson, Ph.D., joined the Missouri Department of Health on July 7, 1986, as a cancer epidemiologist for the Division of Environmental Health and Epidemiology Services. He coordinates the activities of the cancer epidemiology unit, including case inquiries and joint research with the Missouri Cancer Registry.

Dr. Brownson is a graduate of the College of Veterinary Medicine and Biomedical Sciences at Colorado State University (CSU) in Fort Collins. He has previously worked as a research associate at CSU in veterinary medicine and environmental epidemiology.

Missouri Department of Health

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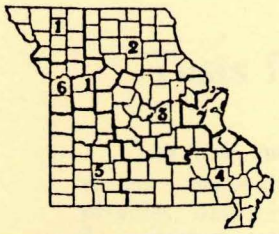

MISSOURI DEPARTMENT OF HEALTH – Epidemiology Services – Communicable Disease Control

BIMONTHLY MORBIDITY REPORT

Reporting Period* May and June , 19 86

	DISTRICTS							Kansas City	St. Louis City	St. Louis County	2 Month State Totals		Cumulative		
	1	2	3	4	5	** 6	** 7				1986	1985	for 1986	for 1985	5 Year Median
Vaccine Preventable Dis.															
Chickenpox	71	11	346	305	22	91	5	24	1	7	883	249	4126	2004	
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Influenza	0	0	1	0	1	0	0	1	0	0	3	1	72	60	
Measles	0	12	3	0	2	0	0	1	0	0	18	0	23	2	
Mumps	0	0	1	0	0	1	0	0	0	0	2	4	10	11	
Pertussis	0	0	0	0	1	0	0	0	0	0	1	4	5	13	
Polio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rubella	0	0	0	0	0	0	0	0	0	0	0	7	1	7	
Tetanus	0	0	0	0	1	0	0	0	0	0	1	2	1	2	
Viral Hepatitis															
A	1	0	4	1	13	6	0	6	0	3	34	21	83	66	
B	2	6	9	5	6	0	1	20	3	10	62	48	218	184	
Non A – Non B	0	1	1	1	0	1	0	0	0	7	11	6	23	19	
Unspecified	1	0	0	1	1	0	0	0	0	0	3	3	11	8	
Meningitis															
Aseptic	0	0	0	0	2	0	0	3	1	1	7	11	21	25	
H. influenza	1	0	4	1	3	1	1	2	4	1	18	15	82	52	
Meningococcal	0	0	0	0	0	1	0	1	1	0	3	12	24	31	
Other	4	1	0	1	2	0	1	1	2	1	13	6	58	30	
Enteric Infections															
Campylobacter	4	1	4	0	9	5	4	3	0	17	47	58	100	115	
Salmonella	4	1	22	6	10	5	14	17	67	11	157	86	306	231	
Shigella	2	0	1	0	0	1	0	2	4	1	11	24	27	53	
Typhoid Fever	0	0	1	0	0	0	0	0	0	0	1	1	4	1	
Parasitic Infections															
Amebiasis	1	0	1	3	0	0	0	0	0	0	5	2	11	16	
Giardiasis	11	2	14	2	7	1	1	10	0	11	49	62	162	165	
Toxoplasmosis	0	0	0	1	0	0	0	0	0	0	1	4	13	8	
Sexually Transmitted Dis.															
AIDS	0	0	0	0	1	0	0	8	4	1	14	7	31	18	
Gonorrhea	61	24	108	105	118	109	24	1252	1317	471	3589	3463	9351	9472	
Genital Herpes	10	4	16	13	8	14	17	78	127	67	354	265	922	860	
Nongonococcal urethritis	15	7	38	4	56	25	14	257	677	331	1424	1642	3835	4320	
Primary & secondary syphilis	0	0	0	5	4	6	0	5	3	0	23	23	65	54	
Tuberculosis															
Extrapulmonary	0	0	0	2	1	0	1	0	3	2	9	11	32	23	
Pulmonary	0	3	3	8	4	0	3	3	12	6	42	44	116	109	
Zoonotic															
Animal Bites	1	18	33	16	15	62	14	0	0	0	159	28	415	59	
Psittacosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rabies (Animal)	1	0	8	11	1	0	3	0	0	1	25	5	48	21	
Rocky Mtn. Spotted Fever	0	0	0	2	0	1	1	1	0	0	5	1	5	1	
Tularemia	0	0	4	1	0	0	0	0	0	0	5	10	10	15	

Low Frequency Diseases

Anthrax
Botulism
Brucellosis – 2
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease – 2
Legionnellosis – 6
Leptospirosis
Lymphogranuloma Venereum
Malaria – 2
Plague
Rabies (human)
Reye's Syndrome
Toxic-Shock Syndrome
Trichinosis

Outbreaks

Foodborne/waterborne – 1
Histoplasmosis
Nosocomial
Pediculosis
Scabies
Other – 1

*Reporting Period Beginning May 4, Ending June 28.

**Totals do not include KC, SLC, or SLCo.

Heptachlor contamination of livestock in southern Missouri

On February 28, 1986, the Missouri Department of Health (DOH) learned of a potentially serious problem involving a farm animal feed source with distribution in Arkansas, Oklahoma, and Missouri. A company in the production of alcohol for use in gasohol sought out sources of stressed grain. The spent mash from the distillation process was a succulent, highly digestible feed suitable for livestock. The company made this product available to farmers on a cash-carry basis at a bargain price compared to normal commercial feed supplies.

FDA confirmed by laboratory analysis that samples of spent mash contained heptachlor and all responsible regulatory agencies for the affected areas were notified. Heptachlor is a chlorinated hydrocarbon with the usual long residual qualities of these compounds and the manufactured technical grade contains chlordane as well. The breakdown products of heptachlor and chlordane continue to be toxic and may be quanitated by laboratory analysis. Laboratory results are reported as heptachlor and octachlor epoxide. The FDA action level for the total of these products is 0.1 ppm on a fat basis.

Within Missouri, the distribution of the spent mash was found to be limited to the extreme southwest part of the state, particularly McDonald and Newton Counties. Upon finding an elevated level of heptachlor, the milk of individual farms making up the composite load was analyzed to determine the affected producer. It was quickly determined that seven dairy farms were contaminated as a result of utilizing the common source of feed from Van Buren. This number remained stable throughout the total investigation.

Totally unrelated but simultaneously a second source of animal feed involving stressed seed grain purchased by two farmers near Pottersville in Howell County, Missouri, was found to contain high levels of heptachlor. In this instance the farmers were purchasing stressed seeds supposedly treated with Captan, a fungicide that is deactivated by washing or roasting the treated grain. The two farmers were equipped to put the grain through a roasting process. At least one shipment of the seed grain had been treated with heptachlor and the roasting process was not effective. Thus a total of nine Missouri farms were affected, eight of which were dairy farms.

With the aid of local health departments, contaminated farms were located and milk delivery to the dairy plants was stopped which necessitated disposing of milk on the immediate farm. Selected methods for disposal were directed and monitored by the Division of Environmental Quality, Missouri Department of Natural Resources. Methods utilized were land disposal and lagooning.

When delivery of contaminated milk to the dairy plants was halted, public health concerns immediately focused on finished dairy products which might have been processed from contaminated milk. All manufactured dairy products having a remote possibility of being contaminated were immediately segregated for appropriate sampling and analysis. Products involved were cheddar cheese, condensed and evaporated milk and butter. The fluid milk products were of immediate concern to the Department of Health.

Other concerns involved the possible dispersal of animals from the contaminated herds and possible involvement of meat animals that might have been fed contaminated materials. The Department of Health quarantined the animals on the nine farms. The U.S. Department of Agriculture (USDA), in cooperation with the Missouri Department of Agriculture, immediately instigated a slaughterhouse fat biopsy sampling program for hogs and cattle. All animals slaughtered in selected plants in Missouri were found to be below the action level.

Lactating women expressed interest in getting breast milk analyzed. The service was offered by DOH after an individual interview with the concerned person or a request from her physician.

Representatives of the Centers for Disease Control (CDC) provided input and gathered epidemiological information. The DOH public health veterinarian provided advice to the farmers regarding testing, animal disposal, expected pesticide clearance times, and indemnity programs.

Herd quarantines are being lifted as appropriate, and indemnity payments are being made to dairy farmers for milk. Most of the long shelf-life dairy products, such as cheddar cheese, have been sampled with unacceptable products destroyed. The episode has been very costly to the industry, particularly the individual farmers; the regulatory agencies involved; and to consumers. ■

AIDS Update

The Missouri State Guidelines for Acquired Immune Deficiency Syndrome were released July 23, 1986. These guidelines were developed to provide a common basis for all state agency actions regarding AIDS and HTLV-III infection. This common basis will assure the appropriate management of infection or disease in patients, clients or agency personnel.

As of July 18, 1986, a total of 1,700 people have been counseled and tested through Missouri's 12 counseling and testing sites. 325 of these 1,700 have been positive for antibodies to HTLV-III. This represents a positivity rate of 19 percent. Tests run by the state laboratory but drawn by private physicians represent another 1,050 with 95 positives for a positivity rate of 9 percent. *(see statistics, page 6)*

Listing of Missouri AIDS cases by area

Date of Update: 07/28/86

Number of cases reported: 1982 - 1985

Missouri	86*
St. Louis City	33
St. Louis Co.	9
Kansas City	22
Spfld/Greene	8
M.C. Fed. Prison	2
Outstate Mo.	12

Total confirmed cases CY 1985 - 51
Total deaths of CY 85 cases - 22

	Reported to date	Reported to date '86	Deaths Rptd.	Deaths Rptd. '86 cases	Pending
St. Louis City	45	12	26	6	6
St. Louis Co.	11	2	7	2	4
Kansas City	40	18	21	6	10
Spfld/Greene	8	-	5	1	3
M.C. Fed. Pris.	3	1	-	-	3
Outstate Mo.	21	9	8	3	5
Mo. Total	128	42	67	18	31

Summary of 128 Missouri AIDS cases 1982 to date

Illness Characteristics

40 (31%) - PCP alone
38 (30%) - PCP without KS (but with other OI **)
29 (23%) - OI with KS or PCP
7 (05%) - KS alone
6 (05%) - KS without PCP (but with other OI)
6 (05%) - Both KS and PCP (with other OI)
6 (05%) - Both KS and PCP (without other OI)

Primary Risk Factors

106 (83%) - Cases with gay exposure
8 (06%) - Cases with IV drug abuse
7 (06%) - Cases with underlying hemophilia
4 (03%) - Cases received blood transfusion
3 (02%) - Cases with unknown risk factors

Patient Characteristics

100 (78%) - White male
21 (15%) - Black male
4 (03%) - Other
2 (02%) - White female
1 (01%) - Black female

* 1-1982, 6-1983, 28-1984, 51-1985
** OI= Opportunistic Infection

40 additional cases diagnosed and reported in Missouri, with official residence elsewhere.
NON A-1 Cases Reported 1986 - **3**
1986 Average Age - **38.4** To-date average age - **37.6**

Missouri EPIDEMIOLOGIST

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Missouri EPIDEMIOLOGIST

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Summary of the Quail Run Mobile Home Park Dioxin Health Study

The following report is a summary of a major dioxin health study conducted in Missouri in 1984-1985. It was published in the Journal of the American Medical Association, April 18, 1986, and was authored by Richard E. Hoffman, M.D., and others. Reprints are available through the Missouri Dioxin Health Study.

INTRODUCTION

In 1971, sludge wastes contaminated with dioxin (TCDD) were taken from a hexachlorophene production facility in Verona, Missouri, and mixed with waste oil. This mixture was sprayed for dust control on residential, recreational, and commercial areas of eastern Missouri near St. Louis. Nine residential sites related to the contaminated waste oil have been confirmed as having at least one part TCDD per billion parts soil (ppb). Since no exposure-reduction activities were initiated at any residential site until 1982, there was the potential for human exposure to levels of TCDD above 1 ppb for 11 or more years at all nine residential sites.

The Quail Run Mobile Home Park was selected for study because TCDD has been measured there at higher levels (up to 2,200 ppb) than at any other residential site in Missouri. It was detected along the entire length of the road that runs through the park, with levels ranging from 39 ppb to 1,100 ppb in composite soil samples (2,200 ppb TCDD was measured in a single, noncomposite sample). It was measured at levels above 1 ppb along both road shoulders, in four of eight yards tested, in dust samples collected from the interiors of 21 of 31 mobile homes tested (the highest level being, 11.5 ppb), in the wall insulation of at least one mobile home, and in the furnace air filter of at least one mobile home.

METHODS

Any individual who resided at the Quail Run Mobile Home Park for six or more months between April 1971 and May 1983 was considered exposed to TCDD and eligible to participate in the study. For the period, 207 households had lived at Quail Run. Locating information was obtained on 95 households that included 207 individuals. Recruitment was attempted on all of these individuals with 154 persons (74%) finally enrolled in the study. A comparison group was sought with individuals who had no potential exposure to TCDD and had lived for six months or longer in a mobile home park with similar sized mobile homes and upkeep roughly equivalent to that of the mobile homes at Quail Run. Three mobile home parks in the St. Louis metropolitan area fit the criteria and were determined free of TCDD by the EPA.

Two hundred one individuals from 109 households were both eligible and interested in the study, and 155 (77%) individuals agreed to participate. Medical examinations were conducted from November 1984 through January 1985. Each participant received a physical examination, was administered a standard questionnaire, was evaluated for evidence of sensory peripheral neuropathy, and was given a set of neurobehavioral tests. Each participant also was administered a battery of laboratory tests that included urinalyses, urine cultures, complete blood cell counts, and

(Continued on page 2)

IN THIS ISSUE...

immune system tests. A delayed-type hypersensitivity skin test (DTH) was administered to the forearm of each participant as a part of the immune system testing. DTH responses were read by one of four readers approximately 48 hours after the examination on all but 26 (18 exposed and 8 unexposed) participants.

RESULTS

There were no statistically significant differences between the exposed and unexposed individuals on most group characteristics. The exposed group had lower educational and socioeconomic levels than did the unexposed group (P<.01).

There were no statistically significant differences between the two groups in the number of self-reported physician-diagnosed medical conditions except for "other skin problems" and "other miscellaneous diseases." No cases of chloracne, porphyria cutanea tarda (PCT), lymphoma, sarcoma, or cancer of the liver were reported.

The physical examination determined that the exposed group had an increased frequency of non-specific dermatitis that was statistically significant (grouping lesions from all anatomic sites together, 16 vs. 2; P<.01). No cases of chloracne or PCT were diagnosed in these individuals or in any other participant.

The hematology, urinary, and serum chemistry findings had statistically significant differences in mean white blood cell count (7,100/cu mm vs 6,600/cu mm; P<.05), mean absolute granulocyte count (4,300/cu mm vs 3,900/cu mm; P<.05). The exposed group had an increased prevalence of elevated white blood cell count greater than 10,000/cu mm (5.3% vs 0.7%; P<.05). The exposed group had an increased prevalence of elevated urinary uroporphyrin levels greater than 13 µg per gram of creatinine (16.3% vs. 7.5%; P<.01) and a significantly higher (P<.05) mean level of urinary uroporphyrins. No significant differences were found between group means for any serum analyte except for serum choloesterol, creatinine, and bilirubin.

Analysis of data from the DTH readers indicated a significantly higher rate of anergy (no reaction) in the unexposed group than expected (P<.01) when compared with published norms for a healthy population. This problem was seen in two of the four reader's results. DTH results, therefore, are reported only for 145 participants (54% of the total group, accounting for 39% of the exposed and 68% of the unexposed) examined by the other two readers. Six (11.8%) of 51 exposed subjects were anergic compared with one (1.1%) of 93 unexposed subjects (P<.05). The frequency of relative anergy (one reaction or less) was increased in the exposed group (35.3% vs. 11.8%; P<.01). T-cell surface marker test results showed statistically significant decreased percentages of T3, T4, and T11 cells (P<.05) in the exposed group, but the mean number of each of the T-cell subsets was comparable between groups. A greater percentage of the exposed than the unexposed participants had at least one abnormal in vitro immune test result (26.7% v. 14.1%; P<.05).

The neurosensory tests were compared based on the thresholds of the two groups for each digit on both the tactile and thermal sensory tests. There were no differences in mean threshold scores.

CONCLUSION

The findings of this study suggest that long-term exposure to TCDD may have adverse consequences. Exposure to TCDD was associated with depressed DTH responses and in vitro immune abnormalities. In view of the absence of significant differences in reports of clinically diagnosed immune suppression and prolonged or repeated infections, the abnormalities found in this study should be considered subclinical.

EDITOR'S NOTE

Because of the results (reported above) on the DTH (82) and T-cell surface marker (22) testing, a follow-up medical evaluation was conducted in April 1986. Of the 104 individuals invited back for further testing, 57 (55%) actually returned. Each participant received a shortened physical examination, was questionned concerning their health since the last examination, and was administered a DTH test to a forearm. Blood was collected from each person to conduct hematology and immune system testing. Results of the follow-up are currently being analyzed. ■

The Bureau of Communicable Disease Control has **rifampin available for prophylaxis** of household, daycare and other intimate contacts of patients with invasive *Haemophilus influenzae* type b disease or meningococcal meningitis. Prophylaxis is recommended to decrease the probability of secondary cases, and rifampin is the drug of choice. Arrangements for obtaining rifampin can be made through your local health unit when a case is reported. Hib and meningococcal meningitis are Category I diseases, which should be reported by telephone within 24 hours of suspected diagnosis. To report, call your local health unit or 1/800-392-0272.

A **videotape on the control of head lice** is available for loan from the Bureau of Communicable Disease Control. This tape, developed by California State University, is designed for use in schools by students, staff and teachers, as a tool in understanding and dealing with the problems of head lice. Primary emphasis is on identification, treatment and prevention of head lice. To borrow this 1/2 inch VHS tape, write the Films and Literature Unit, P.O. Box 570, Jefferson City, MO 65102. If needed within seven days, call 314/ 751-2218.

Lung Cancer in Southwest Missouri

An excess of deaths due to lung cancer in southwest Missouri has been noted over the past 30 years[1,2]. The highest lung cancer mortality rates have been observed among males in Jasper County. The relative contributions of smoking, occupation, and other environmental factors remain unclear. The Cancer Research Center (CRC) and the Cancer Epidemiology and Control Program, DOH have begun a cooperative study of lung cancer in Jasper County.

The CRC has identified various immunological tests to detect lymphocyte alterations between cancer patients and healthy individuals. The tests to be included in the study are nucleoside biochemistry profiles, cytofluorometry tests, and tumor antibody assays. Some of the tests are so sensitive that they may identify pre-malignant alterations in high risk individuals (e.g., smokers) and may prove useful in screening. The epidemiologic portion of the study will consist of a case-control study of male lung cancer patients and their age-matched controls.

The areas of interest in the case-control protocol include: smoking habits, second-hand smoke exposure, occupational exposures, residence history, diet, and family history of cancer. Residential radon data for the area, collected by the Division of Environmental Health and Epidemiology Services, may also be incorporated into the analyses. The blood sampling for immunological assays and the interview will be conducted for each case and control. The lung cancer cases will be rapidly identified after diagnosis through hospitals in the area and through the Missouri Cancer Registry. ■

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1. Mason, TJ, McKay FW, Hoover WJ, Blot WJ, Fraumeni JF Jr. Atlas of cancer mortality for U.S. counties 1950-69. DHEW Publ. No (NIH) 75-780.

2. Marienfeld CJ, Booth S, Chang J, Reddy R, Wright H, Rust P, Donnell D, Winkelmann R. Age specificity in the lung cancer mortality rate investigations of environmental factors in the southwest Missouri lead and zinc mining districts. Trace substances in environmental health - XVII. DD Hemphill, ed., University of Missouri, Columbia, 1983.

Copper Poisoning at a Local Fair

At approximately 10 a.m. on July 29, 1986, an adult woman and two daughters, who were part of a Girl Scout Troop performing at a local fair in southwest Missouri, came to the first aid station presenting symptoms of vomiting and abdominal distress. After vomiting, the two girls' symptoms resolved almost immediately. Investigation by the Environmental Health team of the Springfield-Greene County Health Department which was at the first aid station, determined that abdominal distress occurred within minutes of partially consuming a soft drink.

It was determined that the soft drink was fountain-dispensed. The food stand where the soft drink was purchased was temporarily closed. The owner agreed to a detailed examination of the dispensing system.

Based upon the symptomology presented, it was suspected that a heavy metal poison was the primary cause. The possibility existed that a backflow preventer had failed somewhere within the system of mixing and dispensing lines. With the failing of the backflow preventer, the possibility existed that either cleanser or carbonated beverage had stayed in contact with metal surfaces the previous night, eroding metal ions that were incorporated into the drinks. Samples were drawn for atomic absorption analysis at the environmental health laboratory in Springfield.

An inspection of the equipment revealed a check valve in the carbonation line that prevents carbonated water from reverse flow into a copper tubing line which carries potable tap water which is then mixed with the syrup for finished product dispensing. Laboratory analyses, which were received at 2:30 p.m., revealed the "tap" potable water before entering the system had a copper level of .15 ppm, zinc of .7 ppm and chromium nondetectable. The same tap water after going through the copper tubing coils revealed a copper level of 2.1 pp zinc 2.0 ppm, and chromium, nondetectable. The suspected finished product tested 2.7 ppm copper, zinc 2.2 ppm and chromium nondetectable.

Another flavor finished product tested 6.4 ppm copper, 3.8 ppm zinc and chromium nondetectable. The suspected soft drink line, according to the manager, had been flushed prior to taking samples. However, the other line had not been flushed and was determined to be used only during peak periods of trade. Examination of the check-valve which allowed carbonated water to back into the copper line revealed a stuck spring, allowing for backflow siphonage.

Repair and flushing of the system was completed by 3:30 p.m. Laboratory analysis of the finished product after repair, completed by 4:30 p.m., revealed acceptable results for copper. The stand was re-opened for business at 5 p.m. The patients were strongly advised to seek medical evaluation but reported they were feeling "O.K." and proceeded to their next performance. ■

Outbreak of GI Illness Associated with Water at Missouri Campgrounds

On July 31, 1985, the Greenfield City Health Department in Wisconsin contacted the Missouri Bureau of Communicable Disease Control regarding a number of persons traveling from Wisconsin and Illinois who had suffered gastrointestinal (GI) illness after camping at a campground in Marion County, Missouri.

Nine families from Wisconsin and three from Illinois (total 35 people) were camping in Illinois, Missouri and Iowa. Campers brought food from home and some brought their own water for drinking and bathing. No communal meals were served and the families ate out together as a group only once at a Misouri restaurant where everyone ordered different items from the menu.

Sixteen cases of GI illness occurred among the travelers between July 24 and 30. Twenty-nine members of the group responded to a survey; the attack rate for persons responding was 16/29 or 55.2%. Symptoms included nausea, abdominal cramping, diarrhea, headache, vomiting, fever, dizziness, prostration, and myalgia. Patients had not sought medical attention, thus no organisms were identified.

Patients complained that water at the Missouri campsite had a metallic or iron taste; there was low pressure at the tap; and the swimming pool was cloudy. Reports of numerous wild ducks on the campground were also received. All ill persons had drunk water from the campground, whereas persons not ill drank water brought from their homes.

The campground well water was tested for coliform bacteria and was found to have confluent growth on the plate, indicating gross contamination. A second test showed confluent growth of fecal coliforms.

The source of contamination of the well water was unknown. Since the well was relatively shallow (60 feet deep), surface contamination may have occurred from the pond, underground streams or a crack in the well housing. After receiving results of the water testing, chlorination was performed. A second chlorination was done after the second water sample tested unsatisfactory. Subsequent water samples tested satisfactory.

On October 21, 1985, a request was made to have the campground put under the rules and regulations of the Department of Natural Resources (DNR) for non-community water supplies. The evaluation given by DNR was to provide for automatic chlorination, adequate pressure and vacuum breaks to prevent possible back-siphonage. A recommendation was also made for the county health department to provide regular inspection and testing of the swimming pool facilities. ■

Missouri EPIDEMIOLOGIST

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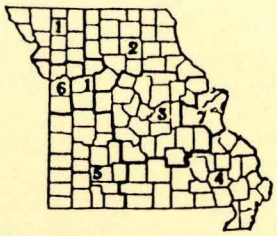


MISSOURI DEPARTMENT OF HEALTH – Epidemiology Services – Communicable Disease Control

BIMONTHLY MORBIDITY REPORT

Reporting Period* July and August , 19 86

	DISTRICTS							Kansas City	St. Louis City	St. Louis County	2 Month State Totals		Cumulative		
	1	2	3	4	5	** 6	** 7				1986	1985	for 1986	for 1985	5 Year Median
Vaccine Preventable Dis.															
Chickenpox	3	7	5	35	3	2	2	0	0	0	57	23	4183	2027	
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Influenza	0	0	0	0	0	0	0	0	0	0	0	1	72	61	
Measles	0	7	0	0	0	0	0	0	0	1	8	0	31	2	
Mumps	0	0	0	0	0	0	1	0	0	0	1	0	11	11	
Pertussis	0	3	0	0	0	2	0	1	0	1	7	11	12	24	
Polio	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
Rubella	0	0	0	0	0	0	0	0	0	0	0	0	1	7	
Tetanus	0	0	0	0	0	0	0	0	1	0	1	1	2	3	
Viral Hepatitis															
A	1	1	2	1	15	5	0	0	0	3	28	10	111	74	
B	8	4	12	0	5	5	2	13	6	16	71	66	289	253	
Non A – Non B	0	0	3	1	0	1	1	1	1	0	8	9	31	28	
Unspecified	0	0	0	0	0	2	1	0	0	0	3	7	14	14	
Meningitis															
Aseptic	1	1	0	4	3	1	1	29	0	8	48	47	70	72	
H. influenza	1	0	0	2	4	1	3	2	4	5	22	18	105	70	
Meningococcal	0	0	0	3	0	0	0	0	1	1	5	2	29	33	
Other	0	0	3	0	4	1	2	3	4	1	18	4	76	34	
Enteric Infections															
Campylobacter	3	2	8	3	17	11	7	11	0	33	95	88	195	203	
Salmonella	8	8	27	8	20	4	9	22	67	17	190	153	496	385	
Shigella	0	0	1	2	1	1	0	6	6	4	21	44	48	97	
Typhoid Fever	0	0	0	0	0	0	0	0	0	2	2	0	6	1	
Parasitic Infections															
Amebiasis	0	0	3	4	0	0	0	1	0	0	8	2	19	18	
Giardiasis	13	9	27	0	10	4	5	7	1	5	81	76	243	241	
Toxoplasmosis	0	0	0	1	0	0	0	0	0	0	1	3	14	11	
Sexually Transmitted Dis.															
AIDS	0	0	0	1	3	0	2	15	3	2	26	8	57	26	
Gonorrhea	53	38	124	89	156	109	32	968	1230	370	3169	3716	12520	13188	
Genital Herpes	4	6	40	2	4	9	15	20	91	46	237	417	1159	1277	
Nongonococcal urethritis	10	3	31	10	60	30	15	285	687	253	1384	1528	5219	5848	
Primary & secondary syphilis	0	0	1	6	2	0	0	3	2	1	15	23	80	77	
Tuberculosis															
Extrapulmonary	0	0	0	1	1	0	1	1	4	0	8	7	40	30	
Pulmonary	0	6	6	7	8	4	2	8	8	6	55	49	171	158	
Zoonotic															
Animal Bites	70	29	23	39	24	62	38	0	2	1	288	143	703	202	
Psittacosis	0	1	0	0	0	0	0	0	0	0	1	0	1	0	
Rabies (Animal)	0	0	1	10	1	1	1	0	1	1	16	14	64	38	
Rocky Mtn. Spotted Fever	1	0	1	5	6	0	1	0	0	1	15	3	20	4	
Tularemia	0	0	3	2	7	1	0	0	0	0	13	7	22	22	

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease
Legionnellosis – 6
Leptospirosis – 1
Lymphogranuloma Venereum
Malaria – 6
Plague
Rabies (human)
Reye's Syndrome
Toxic-Shock Syndrome
Trichinosis

Outbreaks

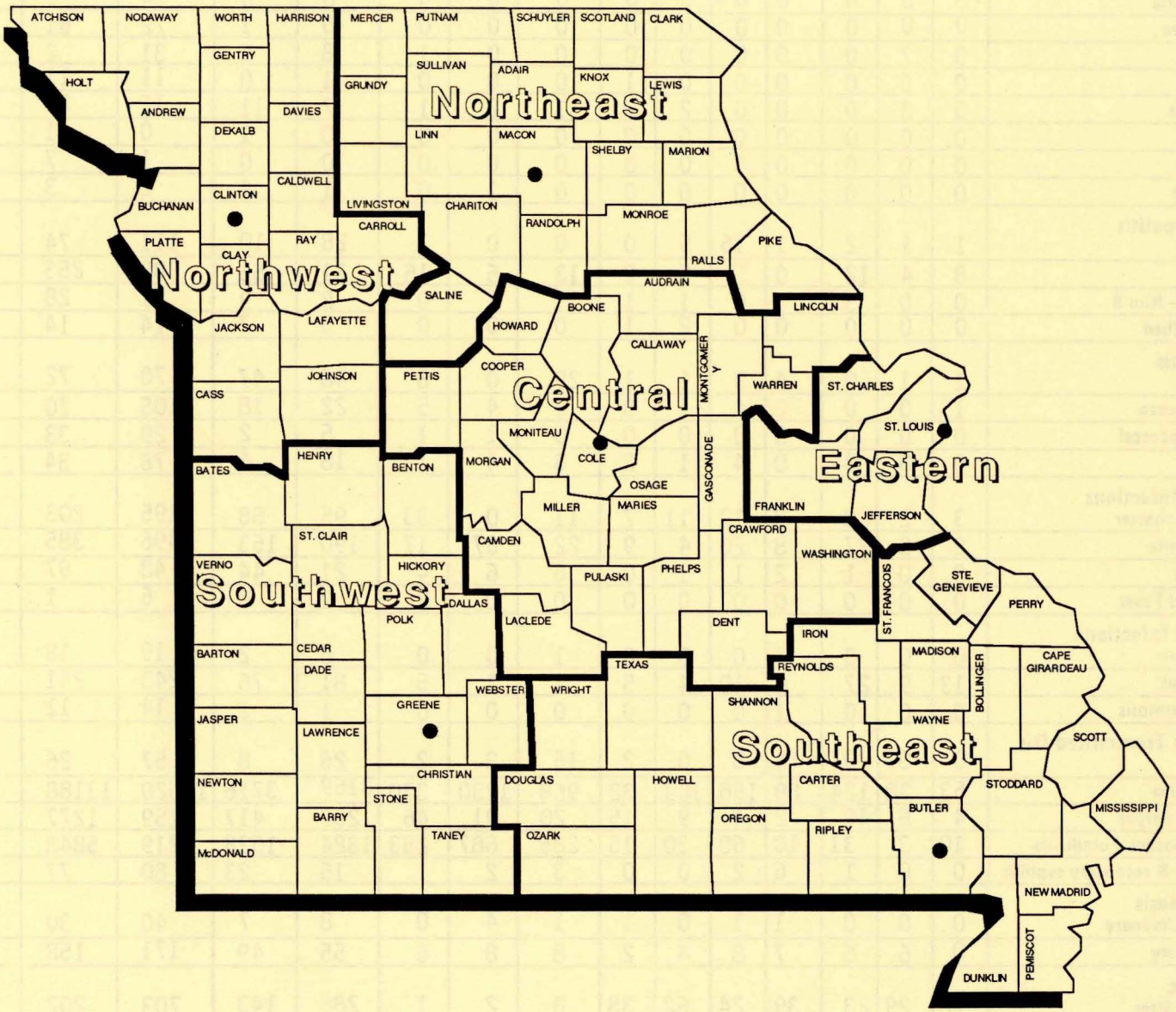
Foodborne/waterborne – 2
Histoplasmosis
Nosocomial – 2
Pediculosis
Scabies – 1
Other – 1

*Reporting Period Beginning June 29, Ending August 30.

**Totals do not include KC, SLC, or SLCo.

Due to data editing, totals may change.

Missouri Department of Health



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Northeastern District	(formerly Dist. #2)	123 North Allen, Macon, MO 63552	**816 / 385-3125**
Central District	(formerly Dist. #3)	907 Missouri Blvd., Jefferson City, MO 65101	**314 / 751-4216**
Southeastern District	(formerly Dist. #4)	1812 South Broadway, Poplar Bluff, MO 63901	**314 / 785-9634**
Southwestern District	(formerly Dist. #5)	1150 East Latoka, P.O. Box 777, Springfield, MO 65801	**417 / 883-1555**
Eastern District	(formerly Dist. #7)	59th & Arsenal, Suite 200, St. Louis, MO 63139	**314 / 781-7825**

Missouri EPIDEMIOLOGIST

Vol. VIII, No. 6 November / December 1986

The Byers Warehouse Study

Background

City and state officials became aware of the presence of ethylene dibromide (EDB) in the Byers Warehouse at 18th and Penn streets, St. Joseph, Missouri, when two policemen were overcome after entering the warehouse on August 6, 1986. Action was taken immediately by the Environmental Protection Agency (EPA) and the producer of the chemical (Vulcan Chemicals) to clean up the spill, repack the containers of EDB, and monitor the area for unsafe levels of chemicals.

Organic vapor levels outside the warehouse never rose above a detection limit of one part per million (ppm) after daily monitoring began on August 8. The St. Joseph/Buchanan County Health Department conducted a brief health survey on August 8, and found no adverse health effects. In this report any reference to EDB in Byers Warehouse is meant to include the EDB and the chemicals mixed with it, primarily carbon tetrachloride and chloroform.

After area residents became aware of the EDB, some expressed concern about possible health effects. Requests were made to officials of St. Joseph City, EPA, Missouri Department of Health (DOH), and Vulcan Chemicals for comprehensive medical examinations. These requests were rejected because no appropriate clinical tests existed and due to the lack of evidence that the EDB had moved off site. At a public hearing on September 3, area legislators requested that an epidemiological survey be conducted to identify possible EDB-related health problems in the area around Byers Warehouse. DOH agreed.

Study Design

Department of Natural Resources (DNR) air monitoring data for June through August 1986 revealed that the wind blew from the southwest approximately 85% of the time. Therefore, two 12 square block areas lying on a southwest-northeast axis were selected with the Byers Warehouse as the approximate center. These areas were chosen based on prevailing wind direction and proximity to the warehouse. One area was just southwest and the other just northeast of the warehouse. Each 12-square block area contained approximately 230 households. Using a geographical grid, 50 homes were randomly selected from each area and one member of each household was interviewed. When no one from the selected home was available, the next nearest home was used.

The survey included questions on number in household, length of residence, awareness and source of information on the warehouse leak, odors noticed, time outside, length of time windows were open, exposure to toxic chemicals at home or work, whether and what health problems had been experienced in the previous four months, whether a doctor had been seen or work had been missed, and whether anyone in the household smoked.

IN THIS ISSUE...

From the original group of 100 households, two other comparison groups were selected based solely on prevailing wind. The downwind group had 40 households in it while the upwind group had 42. Each area is approximately the same size and distance from the warehouse.

The questionnaire was administered on September 25 and 26. The data were entered on a computer and analyzed. Responses for the upwind/downwind areas were compared using standard analytical methods.

Six employees of a news service, who worked in Byers Warehouse were also interviewed. These employees had worked 8 hours per week (1 hour/ day, Monday - Thursday; 4 hours/ day Friday) on the first floor of the warehouse until the end of July.

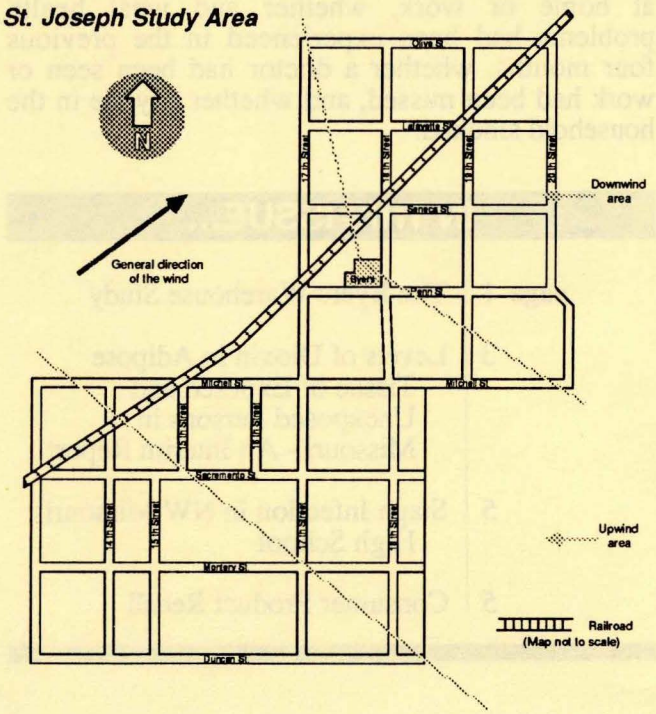
Results

Comparisons of the downwind-upwind groups are tabulated below. In the comparison based on prevailing winds, there was no significant difference between reported health problems between the downwind area (26/40) and the upwind area (24/42).

Comparison of Responses

Factor	Downwind	Upwind
Aware of leak	0/40 (100%)	42/42 (100%)
Noticed Odors	22/40 (55%)	20/42 (48%)
Exposed to toxics at home or work	24/40 (60%)	26/42 (62%)
Health problems	26/40 (65%)	24/42 (57%)

St. Joseph Study Area



In the downwind area, the most frequently reported symptoms were headaches, coughing, eyes watering, dizziness, stuffy nose and nausea. Upwind the most reported symptoms were headaches, nausea, vomiting, fatigue, eyes watering, dizziness, coughing, and nose and throat irritation.

All of the news service employees reported health problems including severe eye, nose, and throat irritation, nausea, and headaches. At the time of the interview, one employee still had a dry, scaly red colored rash that may have resulted from exposure to EDB. All six employees reported smelling strong odors apparently coming from the basement.

Discussion

Ethylene dibromide (EDB) is known to cause skin, throat, and eye irritation. It can also affect the nervous and respiratory systems after workplace exposure to levels above 20 parts EDB per million parts of air (ppm). It does not appear to cause acute symptoms below the 20 ppm level. EDB is eliminated from the body in one to two days. Long-term workplace exposure to EDB at levels below 20 ppm may cause cancer and/or reproductive effects. Typical workplace exposure is 40 hours/week for several years.

It is doubtful that these reported health problems were due to EDB because this chemical is heavier than air and, therefore, it is unlikely that any of the leaked materials moved out of the basement. Monitoring data did not reveal any releases. This conclusion is further supported by the finding that there is no significant difference between the upwind and downwind groups.

The health problems reported by news service employees are consistent with chemical exposure. Their possible exposure illustrates the potential for harm that storage of toxic materials in a residential area represents. As a general rule, DOH does not recommend storage of large volumes of toxic or hazardous substances in or near residential areas. While precautionary measures such as monitoring, safe packaging and frequent inspection can be applied to stored chemicals, everything possible should be done to store them in non-residential areas.

The EDB was moved from the warehouse the week of November 3, 1986. The City of St. Joseph is seeking to have the other chemicals in the ware-house moved as soon as possible.

This study was conducted by the Bureau of Environmental Epidemiology, Division of Environmental Health and Epidemiology Services, Missouri Department of Health. Further information on this study can be obtained by calling (314) 751-6102 or 1-800-392-7245. ■

Levels of 2,3,7,8,-Tetrachlorodibenzo-p'-dioxin in Adipose Tissue of Exposed and Unexposed Persons in Missouri

-AN INTERIM REPORT-

INTRODUCTION

In 1971, industrial sludge waste containing 2,3,7,8,- Tetrachlorodibenzo-p'-dioxin (TCDD, commonly referred to as dioxin) was moved from a hexachlorophene production facility in Verona, Missouri and mixed with waste oil for use as a spray for dust control on residential, commercial, and recreational areas of eastern Missouri. A total of 40 dioxin sites throughout the state are contaminated at levels equal to or greater than 1 part TCDD per billion parts soil. The contamination is believed to be from waste products generated by the Verona chemical facility.

Since TCDD is extremely toxic to certain animal species, the Missouri Department of Health began epidemiological studies to determine whether exposure to TCDD had resulted in adverse health effects in Missouri. An important component of these studies is the estimate of exposure to TCDD. Individuals have been classified as exposed if they were physically located at or near a confirmed dioxin site. More refined estimates of exposure require information on the length of time at a contaminated site, the concentration of TCDD at the site, and the type of activities at the site. Unfortunately, these refined estimates require information that is difficult to obtain on an individual basis.

In the past few years, methods based on gas chromatography - mass spectrometry have been developed to measure TCDD in human adipose tissue. The purpose of this study was to utilize this new dioxin measurement technique to determine whether concentrations of TCDD in adipose tissue differ in exposed and control groups and whether TCDD levels are associated with specific demographic and exposure characteristics. Reported here are the results for 39 persons with a history of exposure to TCDD and 57 persons with no known exposure. This is an interim report because the investigation is still in progress.

METHODS

Since January 1983, the Missouri Department of Health has maintained a central listing of individuals believed to have been exposed to TCDD. The listing consists of persons who volunteered to complete a questionnaire concerning their medical history, health habits, work history, and potential exposure to TCDD. Based on questionnaire responses, the eligible exposed group for this study consisted of approximately 400 persons who were 1) exposed to areas with TCDD levels in soil between 20 and 100 parts TCDD per billion parts soil (ppb) for two or more years; or 2) exposed to TCDD levels greater than 100 ppb for at least six months. These soil levels were determined by the Environmental Protection Agency (EPA) and reported to the State of Missouri in 1983. Persons who met these criteria were classified as having one of three types of exposure: 1) residential, i.e., either living in close proximity to areas with TCDD contaminated soil or having evidence of contamination inside the home, 2) recreational, i.e., riding or caring for horses in TCDD-contaminated stable arenas at least one time per week, or 3) occupational, i.e., working either in a hexachlorophene production facility or at truck terminals where the grounds had been sprayed with TCDD contaminated waste oil.

Each exposed participant donated approximately 20 grams of subcutaneous adipose from the anterior abdominal wall. Â plastic surgeon administered local anesthesia, removed the tissue, and provided follow-up surgical care. Every eligible person who volunteered was included in the study, except one individual who was taking corticosteroids and was advised by his physician not to participate.

The control group was selected from persons undergoing elective abdominal surgery in one of three hospitals located in St. Louis, Kansas City, and Springfield. Each participant in the control group donated approximately 20 grams of subcutaneous adipose tissue from the anterior abdominal wall during an elective surgical procedure.

Based on responses from a questionnaire, individuals were excluded from the control group who had 1) more than one month of potential direct soil contact at a confirmed TCDD-contaminated site in Missouri, 2) a history of military duty in Southeast Asia at any time from 1962 through 1970, or 3) occupational or commercial contact with trichlorophenol or its derivatives. Also excluded were persons who 1) had abnormal fat metabolism or were in a catabolic state (e.g., had diabetes, lipodystrophies, excessive weight loss, or cancer), 2) were at increased risk of complications from the biopsy (e.g., had a bleeding disorder or immunosuppression); 3) were known to have AIDS, hepatitis, or active tuberculosis, thus imposing unacceptable risks to

laboratory personnel processing the specimens; and 4) were part of a high-risk special study population (e.g., children, pregnant females, and prisoners).

All adipose tissue samples were collected from July through November 1985. All participants were white. Informed consent was obtained from all participants after the nature of the procedure had been fully explained.

RESULTS AND DISCUSSION

All persons in both the exposed and control groups had detectable levels of TCDD in their adipose tissue. Nineteen of the 39 (49%) exposed persons had measurements higher than the highest TCDD level (20.2 ppt) of the 57 controls. Six (15%) of the 39 exposed persons had TCDD levels greater than 100 parts per million (ppt), which was five times higher than the level of the highest control. On the other hand, there were persons from all three exposure subgroups (residential, recreational, occupational) with TCDD levels within the range of the control group. Levels in the occupational group, in general, were higher than those in the residential group.

The control group was analyzed to determine how age and sex influenced the TCDD levels. Regression analysis showed age to be a significant predictor of TCDD level ($p<0.001$), with TCDD increasing approximately 1.3 ppt per decade. After adjustment for age differences, females had slightly higher TCDD levels that were of borderline statistical significance ($p = 0.047$).

The exposed and control groups differed in mean age and percent of males. After controlling for these differences by using multiple regression, exposure status was a significant predictor of TCDD levels ($p<0.001$). Even after persons with TCDD levels greater than 100 ppt were excluded, TCDD levels in the exposed group were significantly higher than those in the controls ($p<0.001$). The geometric mean for the exposed group was more than twice that of the controls.

Five of the six values greater than 100 ppt were from persons exposed to TCDD during the production of hexachlorophene. The other high value (577 ppt) was found in a man exposed to TCDD while horseback riding in a contaminated arena. Prior to this report, the two highest levels of TCDD in adipose tissue were 1,840 ppt, in a specimen obtained at autopsy from a 55-year old woman who had been exposed to TCDD in Seveso, Italy, and 130 ppt, in a specimen obtained during an autopsy in Canada.

Information on the length of time since last exposure is important for determining the half-life of TCDD in humans. The half-life of TCDD in primates has been estimated to be about one year. Recently, an investigator in Switzerland voluntarily ingested radiolabeled TCDD, and from subsequent measurements on urine and feces, he estimated the half-life to be 4.96 years. Rappe measured TCDD in the adipose tissue of a man 31 years after he was exposed in an industrial accident and found a TCDD level of 100 ppt. Assuming a one year half-life, the original levels of TCDD in this man would have been 200,000,000,000 ppt, or 20% of his fat mass — clearly impossible. However, if the half-life were 8 years, the original level of TCDD in Rappe's subject would have been 1,600 ppt — a more plausible number based on our findings.

In the present study, the individuals with TCDD levels of 122 ppt, 166 ppt, and 745 ppt gave a history of last exposure to TCDD from 12 to 14 years before their biopsy. Again, a one- year half-life leads to unacceptably high estimates of original TCDD levels in these men, supporting the contention that the half-life of TCDD in human adipose tissue is longer than one year. These data are consistent with a 5 to 8 year half-life.

CONCLUSION

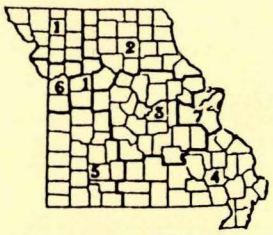
The measurement of TCDD in adipose tissue is a much improved exposure index for studies evaluating the possible health effects of TCDD. Unfortunately, the specimen must be obtained by a minor surgical procedure thus precluding its widespread use. This problem could be overcome either by the development of a method for measuring TCDD levels in a more easily obtained specimen, such as blood, or by mathematical modeling of predictors of adipose TCDD levels that would permit construction of an accurate, noninvasive exposure index.

Completion of this study will provide additional information on the epidemiologic correlates of exposure and on the range of TCDD values in a broad sample of the Missouri population. ■

Editor's Note

This report is a summary of the article as reported in the November 21, 1986 Journal of the American Medical Association, *by Donald G. Patterson, Jr., Ph.D., et. al. Reprints are available through the DOH Dioxin Study.*

Collection of specimens for the study was completed in September. A total of 59 exposed and 127 control individuals volunteered for the study. Data analysis is currently underway and a final report of the complete study is expected in early 1987.



MISSOURI DEPARTMENT OF HEALTH – Epidemiology Services – Communicable Disease Control

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Influenza	0	0	0	0	0	0	0	0	0	0	0	0	72	61	
Measles	0	0	0	0	0	0	0	0	0	0	0	1	31	3	
Mumps	0	1	0	3	0	1	1	0	0	0	6	2	17	13	
Pertussis	0	1	0	0	3	1	0	2	1	0	8	5	20	29	
Polio	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Rubella	0	0	0	0	0	0	0	0	0	0	0	0	1	7	
Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	2	3	
Viral Hepatitis															
A	2	0	2	0	3	3	3	0	0	0	13	15	124	90	
B	3	4	4	2	10	11	1	18	1	1	55	55	342	305	
Non A – Non B	0	0	0	0	0	0	0	1	0	0	1	9	32	37	
Unspecified	0	0	0	0	0	0	0	1	0	0	1	5	15	20	
Meningitis															
Aseptic	3	2	4	2	4	1	4	19	1	7	47	71	118	143	
H. influenza	2	0	2	3	1	0	2	6	6	0	22	22	127	92	
Meningococcal	0	0	1	0	0	0	4	0	0	1	6	6	31	39	
Other	3	0	2	3	1	3	1	3	6	1	23	8	97	42	
Enteric Infections															
Campylobacter	5	0	3	0	11	5	11	0	0	5	40	59	234	262	
Salmonella	1	11	13	16	26	9	9	16	28	18	147	145	643	529	
Shigella	0	0	1	2	0	0	0	4	10	4	21	33	69	130	
Typhoid Fever	0	0	0	0	0	0	0	0	0	0	0	2	5	3	
Parasitic Infections															
Amebiasis	0	0	0	4	0	0	0	0	0	0	4	6	23	24	
Giardiasis	15	13	31	4	13	22	19	7	9	13	146	122	388	363	
Toxoplasmosis	1	1	3	20	0	1	0	3	2	0	31	4	45	15	
Sexually Transmitted Dis.															
AIDS	0	0	2	0	0	0	0	7	7	1	17	11	75	40	
Gonorrhea	105	30	83	94	147	93	29	1201	1043	428	3253	3387	15774	16575	
Genital Herpes	11	5	21	6	7	15	9	114	74	41	389	217	1420	1081	
Nongonococcal urethritis	10	3	32	12	64	19	18	235	572	286	1251	1095	6423	6943	
Primary & secondary syphilis	0	0	0	2	3	0	0	4	4	0	13	27	94	103	
Tuberculosis															
Extrapulmonary	0	0	0	2	0	1	0	2	2	1	8	11	49	41	
Pulmonary	1	1	5	7	9	3	1	11	1	7	46	40	216	198	
Zoonotic															
Animal Bites	30	20	17	23	28	58	32	0	4	1	213	87	916	348	
Psittacosis	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
Rabies (Animal)	0	0	0	2	0	0	0	0	0	1	3	14	67	52	
Rocky Mtn. Spotted Fever	0	0	2	1	1	0	0	0	1	1	6	5	23	9	
Tularemia	0	0	1	1	1	0	0	1	0	0	4	9	25	31	

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease – 1
Legionnellosis – 1
Leptospirosis
Lymphogranuloma Venereum
Malaria – 1
Plague
Rabies (human)
Reye's Syndrome – 1
Toxic-Shock Syndrome– 6
Trichinosis

Outbreaks

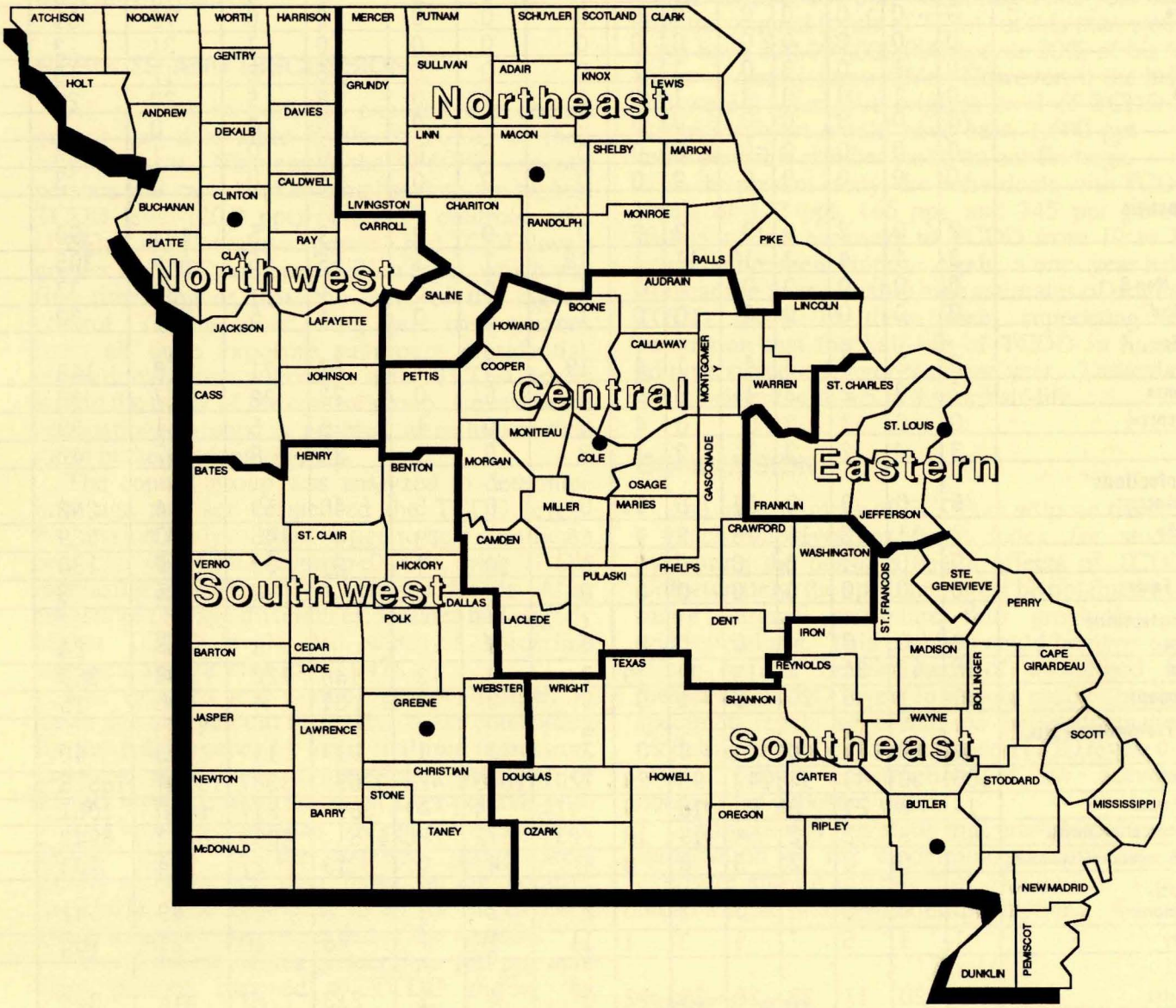
Foodborne/waterborne – 4
Histoplasmosis
Nosocomial – 1
Pediculosis
Scabies – 1
Other – 2

*Reporting Period Beginning Sept. 01, Ending Oct. 31.

**Totals do not include KC, SLC, or SLCo.

Due to data editing, totals may change.

Missouri Department of Health



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Northeastern District	(formerly Dist. #2)	123 North Allen, Macon, MO 63552	**816 / 385-3125**
Central District	(formerly Dist. #3)	907 Missouri Blvd., Jefferson City, MO 65101	**314 / 751-4216**
Southeastern District	(formerly Dist. #4)	1812 South Broadway, Poplar Bluff, MO 63901	**314 / 785-9634**
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Eastern District	(formerly Dist. #7)	59th & Arsenal, Suite 200, St. Louis, MO 63139	**314 / 781-7825**

Coagulase Positive Staphylococcus Skin Infections in a North-Central Missouri High School

In the period August 18 - September 22, 1986, furuncles (skin boils) occurred among 16 students and staff of a north central Missouri high school. Fourteen of the episodes occurred among 44 senior high football players, a teacher and a close friend of an infected football player. All 16 episodes involved one or more skin boils with varying locations on the body — the anterior and lateral thighs, back of the knees, wrists, neck, ankles, cheek and forearms. There was an attack rate of 32 percent among the football players.

In September 1986, the county health department received a call from an infection control nurse at a local hospital reporting the outbreak of skin boils in the football team. The school custodian had asked about disinfection techniques to use in the locker room. The local health department contacted the high school superintendent for additional information regarding the actual number of cases and control measures already implemented. Recommendations made by the health department to the school included:

1. Disinfect with phenol solution
   A. Lockers
   B. Showers and stalls
   C. Sinks, faucets and handles
2. Instruct students to turn off faucets with paper towel (demonstration given).
3. Provide and instruct in use of individual antiseptic soap: Betadine or Chlorxylenol
4. Instruct persons with lesions on their hands not to play football.
5. Instruct to cover any lesions with gauze and impermeable dressing.
6. Instruct and insure all cases to seek medical attention and identification of organism by culturing.
7. All soiled clothes, towels, etc. were to be individually bagged daily in plastic trash bags and taken home and washed in hot, soapy water with appropriate handling of infectious material.
8. Wipe the football gear with disinfectant. The disinfectant should have contact with the gear for 10 minutes before being rinsed off with water. (Disinfectants can cause skin irritation when continuous skin contact occurs.)

An information and instruction letter concerning the outbreak of skin boils was sent by the school to parents of each infected student. Some students had been seen by local physicians but none of the boils had been cultured.

On September 22, 1986, the county and district health departments obtained 34 cultures of nares and lesions among the 14 original cases and two associated cases. Culture results were:

5 coagulase positive, methicillin sensitive by screening procedure in nares cultures

2 coagulase positive, methicillin sensitive by screening procedure in lesions cultured. Multiple phage types of *Staph aureus* were isolated from six cultures.

The clustering of skin infections and culture results indicate direct transmission among football players. Even though all recommendations were implemented immediately by the high school administration during the week of October 10, three new cases and one reoccurrence in the same school were reported with one new positive *Staph aureus* culture from a seventh grade football player. School officials are continuing emphasis on covering of boils and good handwashing technique. Surveillance is being continued by the county and district health departments. ■

—Sandra Clarkson, RN

Consumer Product Recall — A Cooperative Effort

Consumers have been made aware of known and suspect dangers to public health and safety from a variety of products including foods, drugs, and household products.

The Missouri Department of Health has statutory responsibility (Ch196 RSMo 1978) for assuring foods, drugs and cosmetics are not adulterated and are properly labeled. Today most consumer products are distributed nationally. The pattern of distribution by industry results in large volumes of products being made available to the consumer at many retail outlets.

To maintain knowledge of daily production, quality control and inventory information, the

manufacturer "codes" each product.

Product recalls may result from one of several circumstances. The manufacturer may detect a problem with their product and direct a recall, sometimes offering consumer refunds. Occasionally a product is recalled due to consumer complaints or the "threat" that a product has been adulterated by tampering.

The Department of Health has access to a national communication network that provides immediate notification about recalled products. Each notice generates quick responses by the Bureau of Community Sanitation and district and local health department sanitarians.

On receiving information or discovering through our department surveillance efforts that a product recall is necessary, the appropriate industry is contacted and asked to remove the product from the market. Follow-up monitoring is provided by district and local sanitarians to determine the effectiveness of the industry recall. Any situations found during the monitoring which indicate the industry recall is not adequate to protect consumer health and safety prompts an immediate embargo of that item by the Department of Health under provisions of state statutes. When such action is taken by DOH, disposal of the product is directed by the courts unless voluntarily surrendered by the owner.

Recall of a contaminated product protects consumers and protects the reputation of the company, thereby improving long-range acceptance of products by consumers. ■

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Recommendations for Assisting in the Prevention of Perinatal Transmission of Human T-Lymphotropic Virus Type III/Lymphadenopathy-Associated Virus and Acquired Immunodeficiency Syndrome

The information and recommendations in this document are intended to assist health-care providers and state and local health departments in developing procedures to prevent perinatal transmission of human T-lymphotropic virus type III/lymphadenopathy-associated virus (HTLV-III/LAV), the virus that causes acquired immunodeficiency syndrome (AIDS).

This document contains recommendations for providing counselling and, when indicated, testing for antibody to HTLV-III/LAV for women who are at increased risk of acquiring the virus and who are either pregnant or may become pregnant. It is important that these women know they are at risk, as well as know and understand their HTLV-III/LAV-antibody status, so they can make informed decisions to help prevent perinatally acquired HTLV-III/LAV.

Through counselling, uninfected women can learn how to avoid becoming infected, and infected women can choose to delay pregnancy until more is known about perinatal transmission of the virus. If already pregnant, infected women can be provided information for managing the pregnancy and caring for the child.

Currently available data indicate that most pediatric HTLV-III/LAV infections and AIDS are acquired perinatally from infected women, but additional studies are needed to better quantify the risk of transmission from an infected pregnant woman to the fetus or newborn.

The recommendations below pertain to women. However, men who are HTLV-III/LAV-antibody positive should also be counselled regarding the risks of sexual and perinatal transmission, so they can refer for counselling and testing their sex partners who may be pregnant or considering pregnancy.

BACKGROUND

Pediatric AIDS Cases due to Perinatal Transmission. As of December 1, 1985, 217 (1%) of the 15,172 AIDS cases reported to CDC occurred among children under 13 years of age. Sixty percent of these children are known to have died. These 217 cases represent only the more severe manifestations of HTLV-III/LAV infection. Less severe manifestations, often described as AIDS-related complex (ARC), are not reported to CDC, so the number of children with clinically significant illness attributable to HTLV-III/LAV infection is greater than the reported cases of pediatric AIDS. In addition, a number of infected children are probably asymptomatic.

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Of the 217 reported pediatric AIDS patients, 165 (76%) have as their only known risk factor a mother belonging to a group with increased prevalence of HTLV-III/LAV infection. An additional 18% of the pediatric cases are attributable to transfusions of blood or blood products, while risk factor information is missing or incomplete on the remaining 6%. Of the 217 children with AIDS, 48% had mothers who were intravenous (IV) drug abusers; 17% had mothers who were born in Haiti; and 10% had mothers who were sex partners of either IV drug abusers or bisexual men.

Of the patients with perinatally acquired AIDS, 45% resided in New York City, while Florida and New Jersey accounted for an additional 32%.

Mechanisms of Perinatal Transmission. It is believed that HTLV-III/LAV is transmitted from infected women to their fetuses or offspring during pregnancy, during labor and delivery, or perhaps shortly after birth. Transmission of the virus during pregnancy or labor and delivery is demonstrated by two reported AIDS cases occurring in children who had no contact with their infected mothers after birth. One was delivered by Cesarean section (*1,2*).

Transmission of the virus after birth has been implicated in one case of HTLV-III/LAV infection in a child born to a mother reported to have acquired the infection from a postpartum blood transfusion. Since she breastfed the child for 6 weeks, the authors suggested breastfeeding as the possible mode of transmission (*3*). Recently, HTLV-III/LAV has been isolated from the breast milk of infected women (*4*).

Risk of Perinatal Transmission from Infected Mothers. The rate of perinatal transmission of HTLV-III/LAV from infected pregnant women is unknown; however, available data suggest a high rate. In one study of 20 infants born to infected mothers who had already delivered one infant with AIDS, 13 (65%) had serologic and/or clinical evidence of infection with HTLV-III/LAV several months after birth (*5,6*). Since these women were selected on the basis of having previously transmitted HTLV-III/LAV perinatally, this study may overestimate the average risk of transmission for all infected pregnant women.

Perinatal transmission from an infected mother to her newborn is not inevitable. Of three children born to women who became infected with HTLV-III/LAV by artificial insemination from an infected donor, all were in good health and negative for antibody to the virus more than 1 year after birth (*7*). Another child, born to a woman who was already pregnant at the time of AIDS diagnosis and was demonstrated to be viremic, was seronegative, culture negative, and healthy at birth and at 4 months of age (*8*). In a retrospective study evaluating nine children under 5 years of age whose mothers were later diagnosed with AIDS, two (22%) had antibody to HTLV-III/LAV (*9*). The infection status of these women during pregnancy was unknown.

In these studies, the rate of transmission ranged from 0% (0/3) to 65% (13/20). Additional studies are needed to better define the rate of transmission and variables associated with it.

Risk of Illness among Infected Pregnant Women. Pregnancy is associated with suppression of cell-mediated immunity and increased susceptibility to some infections (*10*). The T-helper to T-suppressor ratio is decreased during normal pregnancy, being lowest in the third trimester, and returns to normal approximately 3 months postpartum (*10*). It is not known whether pregnancy increases an infected woman's risk of developing AIDS or ARC, but one study suggests it does (*6*). Fifteen infected women who were well at time of delivery were followed an average of 30 months after the births of their children. Five (33%) subsequently developed AIDS; seven (47%) developed AIDS-related conditions; and only three (20%) remained asymptomatic. These results may not apply to all infected pregnant women, but they do suggest an increased likelihood of developing disease when an HTLV-III/LAV infection occurs in association with pregnancy.

Prevalence of HTLV-III/LAV Infection. Counselling and testing for antibody to HTLV-III/LAV, when indicated, to reduce perinatal transmission of AIDS will be most beneficial in populations of women with increased prevalence of the virus (Table 1). These include: women who have used drugs intravenously for nonmedical purposes; women who were born in countries where heterosexual transmission is thought to play a major role (*11,12*); women who have engaged in prostitution; and women who are or have been sex partners of men who abuse IV drugs, are bisexual, have hemophilia, were born in countries where heterosexual transmission is thought to play a major role (*11,12*), or have evidence of HTLV-III/LAV infection.

The prevalence of antibody to HTLV-III/LAV in U.S. populations of men and women ranges from less than 0.01% in female blood donors to as high as 74% in men with hemophilia (*13-15*). Among heterosexual IV drug abusers, the prevalence of HTLV-III/LAV infection ranges from 2% to 59% in various geographic areas (*16,17*). Seroprevalence among the heterosexual partners of persons at increased risk for AIDS varies from 10% in female partners of asymptomatic, seropositive hemophilia patients to 71% in the female partners of men with AIDS or ARC (*18-20*). Among prostitutes, the HTLV-III/LAV antibody prevalence varies from 5% to 40%, depending on geographic area, with most of the women with positive tests relating histories of IV drug abuse (*21*). Among female blood donors in Atlanta, Georgia, who

TABLE 1. Prevalence of HTLV-III/LAV antibody in heterosexual populations — United States

Populations	Location	No. tested	Prevalence (%)
Intravenous drug abusers (*16,17*)	New York City	274	59
	NJ* < 5 miles from NYC†	204	56
	NJ 5-10 miles from NYC	124	43
	NJ > 100 miles from NYC	55	2
	San Francisco	53	9
Persons with hemophilia (*13,14*)			
Factor VIII concentrate recipients		234	74
Factor IX concentrate recipients		36	39
Cryoprecipitate only recipients		15	40
Female prostitutes (*21*)	Seattle, Washington	92	5
	Miami, Florida	25	40
Female sex partners of men with AIDS or ARC (two separate studies) (*19,20*)		7	71
		42	47
Female sex partners of men with asymptomatic HTLV-III/LAV infection (*18*)		21	10
Haitians (*12*)	New York City	97	4
	Miami, Florida	129	8
Female blood donors (*15*)	Atlanta, Georgia	28,354	0 01

*New Jersey.

†New York City.

denied belonging to high-risk groups, 0.01% had repeatedly reactive enzyme-linked immunosorbent assays (ELISAs) followed by reactive Western blot tests (*15*).

Commercially available tests to detect antibody to HTLV-III/LAV are ELISAs using antigens derived from whole disrupted HTLV-III/LAV. When the ELISA is reactive on initial testing, it is standard procedure to repeat the test on the same specimen. Repeatedly reactive tests are highly sensitive and specific for antibody to HTLV-III/LAV. However, when the ELISA is used to screen populations in which the prevalence of infection is very low (such as blood donors or women not in high-risk groups), the proportion of repeatedly reactive results that are falsely positive will be higher. For that reason, an additional test, such as a Western blot, is recommended following repeatedly reactive ELISA results, especially in low-prevalence populations. In populations with high prevalence of infection (e.g. homosexual men or IV drug abusers), most repeatedly reactive ELISAs are reactive by Western blot or another test. For example, among 109 IV drug abusers whose sera were repeatedly reactive by ELISA, over 85% were reactive by Western blot (*22*). In contrast, in a low-prevalence population of 69 female blood donors whose sera were repeatedly reactive by ELISA, only 5% were reactive by Western blot (*15*).

Due to the seriousness of the implications of HTLV-III/LAV-antibody reactivity, it is recommended that repeatedly reactive ELISAs be followed by an additional test, such as the Western blot. Women with sera repeatedly reactive by ELISA and reactive by Western blot should have a thorough medical evaluation. HTLV-III/LAV has been isolated from a single specimen in 67%-95% of persons with specific antibody (*23,24*). Because infection has been demonstrated in asymptomatic persons, the presence of specific antibody should be considered presumptive evidence of current infection and infectiousness.

RECOMMENDATIONS

Women Who Should be Offered Counselling and Testing. *Counselling services and testing for antibody to HTLV-III/LAV should be offered to pregnant women and women who may become pregnant in the following groups*: (1) those who have evidence of HTLV-III/LAV infection; (2) those who have used drugs intravenously for nonmedical purposes; (3) those who were born in countries where heterosexual transmission is thought to play a major role (*11,12*); (4) those who have engaged in prostitution; (5) those who are or have been sex partners of: IV drug abusers, bisexual men, men with hemophilia, men who were born in countries where heterosexual transmission is thought to play a major role (*11,12*), or men who otherwise have evidence of HTLV-III/LAV infection. If data become available to show that HTLV-III/LAV-antibody prevalence is increased in other groups or settings, counselling and testing programs should be extended to include them. Routine counselling and testing of women who are not included in the above-mentioned groups is not recommended due to low prevalence of infection and concern about interpretation of test results in a low-prevalence population. However if a woman requests it, the service should be provided in accordance with these recommendations.

Settings for Offering Counselling and Testing. Counselling and testing for antibody to HTLV-III/LAV to prevent perinatal transmission is recommended in the setting of any medical service in which women at increased risk are commonly encountered. These include services for treating IV drug abuse (i.e., detoxification and methadone maintenance), comprehensive hemophilia treatment centers, sexually transmitted disease clinics, and clinics that serve female prostitutes. In addition, services related to reproduction, such as family planning and infertility services, gynecologic, premarital, or preconceptual examinations, and prenatal and

obstetric services should also consider offering counselling and testing if high-risk women are seen at these facilities. Testing for antibody to HTLV-III/LAV should be performed with the woman's consent after counselling is provided regarding risk factors for infection, the interpretation of test results, the risks of transmission, and the possible increased likelihood of disease among women infected with HTLV-III/LAV in association with pregnancy. The counselling and testing must be conducted in an environment in which confidentiality can be assured. In settings where confidential counselling and testing cannot be assured, information should be provided and referrals made to appropriate facilities.

Frequency of Testing. Detectable antibodies to HTLV-III/LAV may not develop until 2-4 months after exposure. This, and whether the woman is continuously exposed, should be taken into account when considering the need for, and frequency of, repeat testing. High-risk women should be offered counselling and testing before they become pregnant. During pregnancy, counselling and testing should be offered as soon as the woman is known to be pregnant. If the initial test is negative, repeat testing may be indicated near delivery to aid in the clinical management of the pregnant woman and newborn. If this final test is negative and the mother's risk of exposure no longer exists, she may safely consider breastfeeding the child, and management of the child need not include the same concerns that would be appropriate if the woman had had a positive test or if she were at high risk and had not been tested at all.

Counselling Women with Positive Results. Women with virologic or serologic evidence of HTLV-III/LAV infection should be counselled regarding their own risk of AIDS and the risk of perinatal and sexual transmission of HTLV-III/LAV. Infected women should be counselled to refer their sex partners for counselling and testing. If the partners of these women are not infected, both members of the couple should be counselled on how they may modify their sexual practices to reduce the risk of HTLV-III/LAV transmission to the uninfected partner. In addition, the couple should be told not to donate blood, organs, or sperm and should be discouraged from using IV drugs and advised against sharing needles and syringes. When seeking medical or dental care for intercurrent illness, they should inform those responsible for their care of their positive antibody status so appropriate evaluation can be undertaken. Recommendations for providing information and advice to individuals infected with HTLV-III/LAV have been published (*25*).

Infected women should be advised to consider delaying pregnancy until more is known about perinatal transmission of the virus. Pregnant infected women may require additional medical and social support services due to an enhanced risk of opportunistic infections and psychosocial difficulties during and after pregnancy. Obstetric-care providers should be alert to signs and symptoms of HTLV-III/LAV and related opportunistic infections in these pregnant women and to the need for specialized medical care.

HTLV-III/LAV-infected women should be advised against breastfeeding to avoid postnatal transmission to a child who may not yet be infected. The child should receive follow-up pediatric evaluations to determine whether he/she has HTLV-III/LAV infection, and to diagnose and treat promptly any diseases that may be secondary to HTLV-III/LAV infection. Recommendations for educating and providing foster care for infected children have been published (*26*).

Counselling Women with Negative Test Results. A negative ELISA for HTLV-III/LAV antibody in women who have no clinical or laboratory evidence of HTLV-III/LAV infection is evidence that they have probably not been infected. However, uninfected women who have sex

partners with evidence of HTLV-III/LAV infection or with an increased risk of becoming infected should be informed that sexual intercourse increases their risk of infection. These women should be informed of the risks associated with pregnancy if they become infected and advised to consider delaying pregnancy until more is known about perinatal transmission of the virus or until they are no longer considered to be at risk for acquiring the virus. In addition to preventing pregnancy, the consistent and proper use of condoms can offer some protection against HTLV-III/LAV infection.

High-risk women, even if seronegative, should be told not to donate blood or organs. To decrease their risk of becoming infected, IV drug abusers should be encouraged to seek treatment for their drug abuse. Persons counselling IV drug abusers should know that IV drug abuse is often strongly ingrained and compulsive. Despite educational efforts and encouragement for treatment, some addicts will continue to abuse drugs or relapse after treatment. If drug abuse continues, they should be advised not to share needles or syringes and to use only sterile equipment.

Additional Considerations. These recommendations will be revised as additional information becomes available. It is recognized that provision of the recommended professional counselling, HTLV-III/LAV-antibody testing and associated specialized medical services will take time to implement and may stress available resources, particularly in public facilities, which are most greatly affected. Health-care providers, social-service personnel, and others involved in educating and caring for HTLV-III/LAV-infected persons should be aware of the potential for social isolation and should be sensitive to the need for confidentiality. They should be familiar with federal and state laws, regulations, and policies that protect the confidentiality of clinical data and test results. Each institution should assure that specific mechanisms are in place to protect the confidentiality of all records and to prevent the misuse of information. Anonymous testing would not be appropriate if it prevents adequate counselling and medical follow-up evaluation.

Hospital precautions for managing infected women and infants should be patterned after those for caring for patients with HTLV-III/LAV infection (*27,28*). Additional recommendations will follow.

DEVELOPMENT OF THESE RECOMMENDATIONS

The information and recommendations contained in this document were developed and compiled by CDC and the U.S. Public Health Service in consultation with individuals representing: the Conference of State and Territorial Epidemiologists, the Association of State and Territorial Health Officials, the American Public Health Association, the United States Conference of Local Health Officers, the American Medical Association, the American College of Obstetricians and Gynecologists, the American Academy of Pediatrics, the Planned Parenthood Federation of America, the American Venereal Disease Association, the Division of Maternal and Child Health of the Health Resources and Services Administration, the National Institute on Drug Abuse of the Alcohol, Drug Abuse, and Mental Health Administration, the National Hemophilia Foundation, the Haitian Medical Association, the American Bar Foundation, and the Kennedy Institute of Ethics at Georgetown University. The consultants also included representatives of the departments of health of the areas with the largest number of perinatally transmitted pediatric AIDS cases: New York City, Florida, and New Jersey. These recommendations may not reflect the views of all individual consultants or the organizations they represented.

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Summary: Recommendations for Preventing Transmission of Infection with Human T-Lymphotropic Virus Type III/ Lymphadenopathy-Associated Virus in the Workplace

The information and recommendations contained in this document have been developed with particular emphasis on health-care workers and others in related occupations in which exposure might occur to blood from persons infected with HTLV-III/LAV, the "AIDS virus." Because of public concern about the purported risk of transmission of HTLV-III/LAV by persons providing personal services and those preparing and serving food and beverages, this document also addresses personal-service and food-service workers. Finally, it addresses "other workers"—persons in settings, such as offices, schools, factories, and construction sites, where there is no known risk of AIDS virus transmission.

Because AIDS is a bloodborne, sexually transmitted disease that is not spread by casual contact, this document does *not* recommend routine HTLV-III/LAV antibody screening for the groups addressed. Because AIDS is not transmitted through preparation or serving of food and beverages, these recommendations state that food-service workers known to be infected with AIDS should not be restricted from work unless they have another infection or illness for which such restriction would be warranted.

This document contains detailed recommendations for precautions appropriate to prevent transmission of all bloodborne infectious diseases to people exposed—in the course of their duties—to blood from persons who may be infected with HTLV-III/LAV. They emphasize that health-care workers should take all possible precautions to prevent needlestick injury. The recommendations are based on the well-documented modes of HTLV-III/LAV transmission and incorporate a "worst case" scenario, the hepatitis B model of transmission. Because the hepatitis B virus is also bloodborne and is both hardier and more infectious than HTLV-III/LAV, recommendations that would prevent transmission of hepatitis B will also prevent transmission of AIDS.

Formulation of specific recommendations for health-care workers who perform invasive procedures is in progress.

Recommendations for Preventing Transmission of Infection with Human T-Lymphotropic Virus Type III/ Lymphadenopathy-Associated Virus in the Workplace

Persons at increased risk of acquiring infection with human T-lymphotropic virus type III/lymphadenopathy-associated virus (HTLV-III/LAV), the virus that causes acquired immunodeficiency syndrome (AIDS), include homosexual and bisexual men, intravenous (IV) drug abusers, persons transfused with contaminated blood or blood products, heterosexual contacts of persons with HTLV-III/LAV infection, and children born to infected mothers. HTLV-III/LAV is transmitted through sexual contact, parenteral exposure to infected blood or blood components, and perinatal transmission from mother to neonate. HTLV-III/LAV has been isolated from blood, semen, saliva, tears, breast milk, and urine and is likely to be isolated from some other body fluids, secretions, and excretions, but epidemiologic evidence has implicated only blood and semen in transmission. Studies of nonsexual household contacts of AIDS patients indicate that casual contact with saliva and tears does not result in transmission of infection. Spread of infection to household contacts of infected persons has not been

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detected when the household contacts have not been sex partners or have not been infants of infected mothers. The kind of nonsexual person-to-person contact that generally occurs among workers and clients or consumers in the workplace does not pose a risk for transmission of HTLV-III/LAV.

As in the development of any such recommendations, the paramount consideration is the protection of the public's health. The following recommendations have been developed for all workers, particularly workers in occupations in which exposure might occur to blood from individuals infected with HTLV-III/LAV. These recommendations reinforce and supplement the specific recommendations that were published earlier for clinical and laboratory staffs (*1*) and for dental-care personnel and persons performing necropsies and morticians' services (*2*). Because of public concern about the purported risk of transmission of HTLV-III/LAV by persons providing personal services and by food and beverages, these recommendations contain information and recommendations for personal-service and food-service workers. Finally, these recommendations address workplaces in general where there is no known risk of transmission of HTLV-III/LAV (e.g., offices, schools, factories, construction sites). Formulation of specific recommendations for health-care workers (HCWs) who perform invasive procedures (e.g., surgeons, dentists) is in progress. Separate recommendations are also being developed to prevent HTLV-III/LAV transmission in prisons, other correctional facilities, and institutions housing individuals who may exhibit uncontrollable behavior (e.g., custodial institutions) and in the perinatal setting. In addition, separate recommendations have already been developed for children in schools and day-care centers (*3*).

HTLV-III/LAV-infected individuals include those with AIDS (*4*); those diagnosed by their physician(s) as having other illnesses due to infection with HTLV-III/LAV; and those who have virologic or serologic evidence of infection with HTLV-III/LAV but who are not ill.

These recommendations are based on the well-documented modes of HTLV-III/LAV transmission identified in epidemiologic studies and on comparison with the hepatitis B experience. Other recommendations are based on the hepatitis B model of transmission.

COMPARISON WITH THE HEPATITIS B VIRUS EXPERIENCE

The epidemiology of HTLV-III/LAV infection is similar to that of hepatitis B virus (HBV) infection, and much that has been learned over the last 15 years related to the risk of acquiring hepatitis B in the workplace can be applied to understanding the risk of HTLV-III/LAV transmission in the health-care and other occupational settings. Both viruses are transmitted through sexual contact, parenteral exposure to contaminated blood or blood products, and perinatal transmission from infected mothers to their offspring. Thus, some of the same major groups at high risk for HBV infection (e.g., homosexual men, IV drug abusers, persons with hemophilia, infants born to infected mothers) are also the groups at highest risk for HTLV-III/LAV infection. Neither HBV nor HTLV-III/LAV has been shown to be transmitted by casual contact in the workplace, contaminated food or water, or airborne or fecal-oral routes (*5*).

HBV infection is an occupational risk for HCWs, but this risk is related to degree of contact with blood or contaminated needles. HCWs who do not have contact with blood or needles contaminated with blood are not at risk for acquiring HBV infection in the workplace (*6-8*).

In the health-care setting, HBV transmission has not been documented between hospitalized patients, except in hemodialysis units, where blood contamination of the environment has been extensive or where HBV-positive blood from one patient has been transferred to another patient through contamination of instruments. Evidence of HBV transmission from HCWs to patients has been rare and limited to situations in which the HCWs exhibited high concentrations of virus in their blood (at least 100,000,000 infectious virus particles per ml of serum), and the HCWs sustained a puncture wound while performing traumatic procedures on patients or had exudative or weeping lesions that allowed virus to contaminate instruments or open wounds of patients (*9-11*).

Current evidence indicates that, despite epidemiologic similarities of HBV and HTLV-III/LAV infection, the risk for HBV transmission in health-care settings far exceeds that for HTLV-III/LAV transmission. The risk of acquiring HBV infection following a needlestick from an HBV carrier ranges from 6% to 30% (*12,13*), far in excess of the risk of HTLV-III/LAV infection following a needlestick involving a source patient infected with HTLV-III/LAV, which is less than 1%. In addition, all HCWs who have been shown to transmit HBV infection in health-care settings have belonged to the subset of chronic HBV carriers who, when tested, have exhibited evidence of exceptionally high concentrations of virus (at least 100,000,000 infectious virus particles per ml) in their blood. Chronic carriers who have substantially lower concentrations of virus in their blood have not been implicated in transmission in the health-care setting (*9-11,14*). The HBV model thus represents a "worst case" condition in regard to transmission in health-care and other related settings. Therefore, recommendations for the control of HBV infection should, if followed, also effectively prevent spread of HTLV-III/LAV. Whether additional measures are indicated for those HCWs who perform invasive procedures will be addressed in the recommendations currently being developed.

Routine screening of all patients or HCWs for evidence of HBV infection has never been recommended. Control of HBV transmission in the health-care setting has emphasized the implementation of recommendations for the appropriate handling of blood, other body fluids, and items soiled with blood or other body fluids.

TRANSMISSION FROM PATIENTS TO HEALTH-CARE WORKERS

HCWs include, but are not limited to, nurses, physicians, dentists and other dental workers, optometrists, podiatrists, chiropractors, laboratory and blood bank technologists and technicians, phlebotomists, dialysis personnel, paramedics, emergency medical technicians, medical examiners, morticians, housekeepers, laundry workers, and others whose work involves contact with patients, their blood or other body fluids, or corpses.

Recommendations for HCWs emphasize precautions appropriate for preventing transmission of bloodborne infectious diseases, including HTLV-III/LAV and HBV infections. Thus, these precautions should be enforced routinely, as should other standard infection-control precautions, regardless of whether HCWs or patients are known to be infected with HTLV-III/LAV or HBV. In addition to being informed of these precautions, all HCWs, including students and housestaff, should be educated regarding the epidemiology, modes of transmission, and prevention of HTLV-III/LAV infection.

Risk of HCWs acquiring HTLV-III/LAV in the workplace. Using the HBV model, the highest risk for transmission of HTLV-III/LAV in the workplace would involve parenteral exposure to a needle or other sharp instrument contaminated with blood of an infected patient. The risk to HCWs of acquiring HTLV-III/LAV infection in the workplace has been evaluated in several studies. In five separate studies, a total of 1,498 HCWs have been tested for antibody to HTLV-III/LAV. In these studies, 666 (44.5%) of the HCWs had direct parenteral (needlestick or cut) or mucous membrane exposure to patients with AIDS or HTLV-III/LAV infection. Most of these exposures were to blood rather than to other body fluids. None of the HCWs whose initial serologic tests were negative developed subsequent evidence of HTLV-III/LAV infection following their exposures. Twenty-six HCWs in these five studies were seropositive when first tested; all but three of these persons belonged to groups recognized to be at increased risk for AIDS (*15*). Since one was tested anonymously, epidemiologic information was available on only two of these three seropositive HCWs. Although these two HCWs were reported as probable occupationally related HTLV-III/LAV infection (*15,16*), neither had a preexposure nor an early postexposure serum sample available to help determine the onset of infection. One case reported from England describes a nurse who seroconverted following an accidental parenteral exposure to a needle contaminated with blood from an AIDS patient (*17*).

In spite of the extremely low risk of transmission of HTLV-III/LAV infection, even when needlestick injuries occur, more emphasis must be given to precautions targeted to prevent needlestick injuries in HCWs caring for any patient, since such injuries continue to occur even during the care of patients who are known to be infected with HTLV-III/LAV.

Precautions to prevent acquisition of HTLV-III/LAV infection by HCWs in the workplace. These precautions represent prudent practices that apply to preventing transmission of HTLV-III/LAV and other bloodborne infections and should be used routinely (*18*).

1. Sharp items (needles, scalpel blades, and other sharp instruments) should be considered as potentially infective and be handled with extraordinary care to prevent accidental injuries.
2. Disposable syringes and needles, scalpel blades, and other sharp items should be placed into puncture-resistant containers located as close as practical to the area in which they were used. To prevent needlestick injuries, needles should not be recapped, purposefully bent, broken, removed from disposable syringes, or otherwise manipulated by hand.
3. When the possibility of exposure to blood or other body fluids exists, routinely recommended precautions should be followed. The anticipated exposure may require gloves alone, as in handling items soiled with blood or equipment contaminated with blood or other body fluids, or may also require gowns, masks, and eye-coverings when performing procedures involving more extensive contact with blood or potentially infective body fluids, as in some dental or endoscopic procedures or postmortem examinations. Hands should be washed thoroughly and immediately if they accidentally become contaminated with blood.
4. To minimize the need for emergency mouth-to-mouth resuscitation, mouth pieces, resuscitation bags, or other ventilation devices should be strategically located and available for use in areas where the need for resuscitation is predictable.
5. Pregnant HCWs are not known to be at greater risk of contracting HTLV-III/LAV infections than HCWs who are not pregnant; however, if a HCW develops HTLV-III/LAV infection during pregnancy, the infant is at increased risk of infection resulting from perinatal transmission. Because of this risk, pregnant HCWs should be especially familiar with precautions for the preventing HTLV-III/LAV transmission (*19*).

Precautions for HCWs during home care of persons infected with HTLV-III/LAV. Persons infected with HTLV-III/LAV can be safely cared for in home environments. Studies of family members of patients infected with HTLV—III/LAV have found no evidence of HTLV-III/LAV transmission to adults who were not sexual contacts of the infected patients or to children who were not at risk for perinatal transmission (3). HCWs providing home care face the same risk of transmission of infection as HCWs in hospitals and other health-care settings, especially if there are needlesticks or other parenteral or mucous membrane exposures to blood or other body fluids.

When providing health-care service in the home to persons infected with HTLV-III/LAV, measures similar to those used in hospitals are appropriate. As in the hospital, needles should not be recapped, purposefully bent, broken, removed from disposable syringes, or otherwise manipulated by hand. Needles and other sharp items should be placed into puncture-resistant containers and disposed of in accordance with local regulations for solid waste. Blood and other body fluids can be flushed down the toilet. Other items for disposal that are contaminated with blood or other body fluids that cannot be flushed down the toilet should be wrapped securely in a plastic bag that is impervious and sturdy (not easily penetrated). It should be placed in a second bag before being discarded in a manner consistent with local regulations for solid waste disposal. Spills of blood or other body fluids should be cleaned with soap and water or a household detergent. As in the hospital, individuals cleaning up such spills should wear disposable gloves. A disinfectant solution or a freshly prepared solution of sodim hypochlorite (household bleach, see below) should be used to wipe the area after cleaning.

Precautions for providers of prehospital emergency health care. Providers of prehospital emergency health care include the following: paramedics, emergency medical technicians, law enforcement personnel, firefighters, lifeguards, and others whose job might require them to provide first-response medical care. The risk of transmission of infection, including HTLV-III/LAV infection, from infected persons to providers of prehospital emergency health care should be no higher than that for HCWs providing emergency care in the hospital if appropriate precautions are taken to prevent exposure to blood or other body fluids.

Providers of prehospital emergency health care should follow the precautions outlined above for other HCWs. No transmission of HBV infection during mouth-to-mouth resuscitation has been documented. However, because of the theoretical risk of salivary transmission of HTLV-III/LAV during mouth-to-mouth resuscitation, special attention should be given to the use of disposable airway equipment or resuscitation bags and the wearing of gloves when in contact with blood or other body fluids. Resuscitation equipment and devices known or suspected to be contaminated with blood or other body fluids should be used once and disposed of or be thoroughly cleaned and disinfected after each use.

Management of parenteral and mucous membrane exposures of HCWs. If a HCW has a parenteral (e.g., needlestick or cut) or mucous membrane (e.g., splash to the eye or mouth) exposure to blood or other body fluids, the source patient should be assessed clinically and epidemiologically to determine the likelihood of HTLV-III/LAV infection. If the assessment suggests that infection may exist, the patient should be informed of the incident and requested to consent to serologic testing for evidence of HTLV-III/LAV infection. If the source patient has AIDS or other evidence of HTLV-III/LAV infection, declines testing, or has a positive test, the HCW should be evaluated clinically and serologically for evidence of HTLV-III/LAV infection as soon as possible after the exposure, and, if seronegative, retested after 6 weeks and on a periodic basis thereafter (e.g., 3, 6, and 12 months following exposure) to determine if transmission has occurred. During this follow-up period, especially the first 6-12 weeks, when most infected persons are expected to seroconvert, exposed HCWs should receive counseling about the risk of infection and follow U.S. Public Health Service (PHS) recommendations for preventing transmission of AIDS (*20,21*). If the source patient is seronegative and has no other evidence of HTLV-III/LAV infection, no further follow-up of the HCW is necessary. If the source patient cannot be identified, decisions regarding appropriate follow-up should be individualized based on the type of exposure and the likelihood that the source patient was infected.

Serologic testing of patients. Routine serologic testing of all patients for antibody to HTLV-III/LAV is not recommended to prevent transmission of HTLV-III/LAV infection in the workplace. Results of such testing are unlikely to further reduce the risk of transmission, which, even with documented needlesticks, is already extremely low. Furthermore, the risk of needlestick and other parenteral exposures could be reduced by emphasizing and more consistently implementing routinely recommended infection-control precautions (e.g., not recapping needles). Moreover, results of routine serologic testing would not be available for emergency cases and patients with short lengths of stay, and additional tests to determine whether a positive test was a true or false positive would be required in populations with a low prevalence of infection. However, this recommendation is based only on considerations of occupational risks and should not be construed as a recommendation against other uses of the serologic test, such as for diagnosis or to facilitate medical management of patients. Since the experience with infected patients varies substantially among hospitals (75% of all AIDS cases have been reported by only 280 of the more than 6,000 acute-care hospitals in the United States), some hospitals in certain geographic areas may deem it appropriate to initiate serologic testing of patients.

TRANSMISSION FROM HEALTH-CARE WORKERS TO PATIENTS

Risk of transmission of HTLV-III/LAV infection from HCWs to patients. Although there is no evidence that HCWs infected with HTLV-III/LAV have transmitted infection to patients, a risk of transmission of HTLV-III/LAV infection from HCWs to patients would exist in situations where there is both (1) a high degree of trauma to the patient that would provide a portal of entry for the virus (e.g., during invasive procedures) and (2) access of blood or serous fluid from the infected HCW to the open tissue of a patient, as could occur if the HCW sustains a needlestick or scalpel injury during an invasive procedure. HCWs known to be infected with HTLV-III/LAV who do not perform invasive procedures need not be restricted from work unless they have evidence of other infection or illness for which any HCW should be restricted. Whether additional restrictions are indicated for HCWs who perform invasive procedures is currently being considered.

Precautions to prevent transmission of HTLV-III/LAV infection from HCWs to patients. These precautions apply to all HCWs, regardless of whether they perform invasive procedures: (1) All HCWs should wear gloves for direct contact with mucous membranes or nonintact skin of all patients and (2) HCWs who have exudative lesions or weeping dermatitis should refrain from all direct patient care and from handling patient-care equipment until the condition resolves.

Management of parenteral and mucous membrane exposures of patients. If a patient has a parenteral or mucous membrane exposure to blood or other body fluids of a HCW, the patient should be informed of the incident and the same procedure outlined above for exposures of HCWs to patients should be followed for both the source HCW and the potentially exposed patient. Management of this type of exposure will be addressed in more detail in the recommendations for HCWs who perform invasive procedures.

Serologic testing of HCWs. Routine serologic testing of HCWs who do not perform invasive procedures (including providers of home and prehospital emergency care) is not recommended to prevent transmission of HTLV-III/LAV infection. The risk of transmission is extremely low and can be further minimized when routinely recommended infection-control precautions are followed. However, serologic testing should be available to HCWs who may wish to know their HTLV-III/LAV infection status. Whether indications exist for serologic testing of HCWs who perform invasive procedures is currently being considered.

Risk of occupational acquisition of other infectious diseases by HCWs infected with HTLV-III/LAV. HCWs who are known to be infected with HTLV-III/LAV and who have defective immune systems are at increased risk of acquiring or experiencing serious complications of other infectious diseases. Of particular concern is the risk of severe infection following exposure to patients with infectious diseases that are easily transmitted if appropriate precautions are not taken (e.g., tuberculosis). HCWs infected with HTLV-III/LAV should be counseled about the potential risk associated with taking care of patients with transmissible infections and should continue to follow existing recommendations for infection control to minimize their risk of exposure to other infectious agents (*18,19*). The HCWs' personal physician(s), in conjunction with their institutions' personnel health services or medical directors, should determine on an individual basis whether the infected HCWs can adequately and safely perform patient-care duties and suggest changes in work assignments, if indicated. In making this determination, recommendations of the Immunization Practices Advisory Committee and institutional policies concerning requirements for vaccinating HCWs with live-virus vaccines should also be considered.

STERILIZATION, DISINFECTION, HOUSEKEEPING, AND WASTE DISPOSAL TO PREVENT TRANSMISSION OF HTLV-III/LAV

Sterilization and disinfection procedures currently recommended for use (*22,23*) in health-care and dental facilities are adequate to sterilize or disinfect instruments, devices, or other items contaminated with the blood or other body fluids from individuals infected with HTLV-III/LAV. Instruments or other nondisposable items that enter normally sterile tissue or the vascular system or through which blood flows should be sterilized before reuse. Surgical instruments used on all patients should be decontaminated after use rather than just rinsed with water. Decontamination can be accomplished by machine or by hand cleaning by trained personnel wearing appropriate protective attire (*24*) and using appropriate chemical germicides. Instruments or other nondisposable items that touch intact mucous membranes should receive high-level disinfection.

Several liquid chemical germicides commonly used in laboratories and health-care facilities have been shown to kill HTLV-III/LAV at concentrations much lower than are used in practice (*25*). When decontaminating instruments or medical devices, chemical germicides that are registered with and approved by the U.S. Environmental Protection Agency (EPA) as "sterilants" can be used either for sterilization or for high-level disinfection depending on contact time; germicides that are approved for use as "hospital disinfectants" and are mycobactericidal when used at appropriate dilutions can also be used for high-level disinfection of devices and instruments. Germicides that are mycobactericidal are preferred because mycobacteria represent one of the most resistant groups of microorganisms; therefore, germicides that are effective against mycobacteria are also effective against other bacterial and viral pathogens. When chemical germicides are used, instruments or devices to be sterilized or disinfected should be thoroughly cleaned before exposure to the germicide, and the manufacturer's instructions for use of the germicide should be followed.

Laundry and dishwashing cycles commonly used in hospitals are adequate to decontaminate linens, dishes, glassware, and utensils. When cleaning environmental surfaces, housekeeping procedures commonly used in hospitals are adequate; surfaces exposed to blood and body fluids should be cleaned with a detergent followed by decontamination using an EPA-approved hospital disinfectant that is mycobactericidal. Individuals cleaning up such spills should wear disposable gloves. Information on specific label claims of commercial germicides can be obtained by writing to the Disinfectants Branch, Office of Pesticides, Environmental Protection Agency, 401 M Street, S.W., Washington, D.C., 20460.

In addition to hospital disinfectants, a freshly prepared solution of sodium hypochlorite (household bleach) is an inexpensive and very effective germicide (*25*). Concentrations ranging from 5,000 ppm (a 1:10 dilution of household bleach) to 500 ppm (a 1:100 dilution) sodium hypochlorite are effective, depending on the amount of organic material (e.g., blood, mucus, etc.) present on the surface to be cleaned and disinfected.

Sharp items should be considered as potentially infective and should be handled and disposed of with extraordinary care to prevent accidental injuries. Other potentially infective waste should be contained and transported in clearly identified impervious plastic bags. If the outside of the bag is contaminated with blood or other body fluids, a second outer bag should be used. Recommended practices for disposal of infective waste (*23*) are adequate for disposal of waste contaminated by HTLV-III/LAV. Blood and other body fluids may be carefully poured down a drain connected to a sanitary sewer.

CONSIDERATIONS RELEVANT TO OTHER WORKERS

Personal-service workers (PSWs). PSWs are defined as individuals whose occupations involve close personal contact with clients (e.g., hairdressers, barbers, estheticians, cosmetologists, manicurists, pedicurists, massage therapists). PSWs whose services (tattooing, ear piercing, acupuncture, etc.) require needles or other instruments that penetrate the skin should follow precautions indicated for HCWs. Although there is no evidence of transmission of HTLV-III/LAV from clients to PSWs, from PSWs to clients, or between clients of PSWs, a risk of transmission would exist from PSWs to clients and vice versa in situations where there is both (1) trauma to one of the individuals that would provide a portal of entry for the virus and (2) access of blood or serous fluid from one infected person to the open tissue of the other, as could occur if either sustained a cut. A risk of transmission from client to client exists when instruments contaminated with blood are not sterilized or disinfected between clients. However, HBV transmission has been documented only rarely in acupuncture, ear piercing, and tattoo establishments and never in other personal-service settings, indicating that any risk for HTLV-III/LAV transmission in personal-service settings must be extremely low.

All PSWs should be educated about transmission of bloodborne infections, including HTLV-III/LAV and HBV. Such education should emphasize principles of good hygiene, antisepsis, and disinfection. This education can be accomplished by national or state professional organizations, with assistance from state and local health departments, using lectures at meetings or self-instructional materials. Licensure requirements should include evidence of such education. Instruments that are intended to penetrate the skin (e.g., tattooing and acupuncture needles, ear piercing devices) should be used once and disposed of or be thoroughly cleaned and sterilized after each use using procedures recommended for use in health-care institutions. Instruments not intended to penetrate the skin but which may become contaminated with blood (e.g., razors), should be used for only one client and be disposed of or thoroughly cleaned and disinfected after use using procedures recommended for use in health-care institutions. Any PSW with exudative lesions or weeping dermatitis, regardless of HTLV-III/LAV infection status, should refrain from direct contact with clients until the condition resolves. PSWs known to be infected with HTLV-III/LAV need not be restricted from work unless they have evidence of other infections or illnesses for which any PSW should also be restricted.

Routine serologic testing of PSWs for antibody to HTLV-III/LAV is not recommended to prevent transmission from PSWs to clients.

Food-service workers (FSWs). FSWs are defined as individuals whose occupations involve the preparation or serving of food or beverages (e.g., cooks, caterers, servers, waiters, bartenders, airline attendants). All epidemiologic and laboratory evidence indicates that bloodborne and sexually transmitted infections are not transmitted during the preparation or serving of food or beverages, and no instances of HBV or HTLV-III/LAV transmission have been documented in this setting.

All FSWs should follow recommended standards and practices of good personal hygiene and food sanitation (*26*). All FSWs should exercise care to avoid injury to hands when preparing food. Should such an injury occur, both aesthetic and sanitary considerations would dictate that food contaminated with blood be discarded. FSWs known to be infected with HTLV-III/LAV need not be restricted from work unless they have evidence of other infection or illness for which any FSW should also be restricted.

Routine serologic testing of FSWs for antibody to HTLV-III/LAV is not recommended to prevent disease transmission from FSWs to consumers.

Other workers sharing the same work environment. No known risk of transmission to co-workers, clients, or consumers exists from HTLV-III/LAV-infected workers in other settings (e.g., offices, schools, factories, construction sites). This infection is spread by sexual contact with infected persons, injection of contaminated blood or blood products, and by perinatal transmission. Workers known to be infected with HTLV-III/LAV should not be restricted from work solely based on this finding. Moreover, they should not be restricted from using telephones, office equipment, toilets, showers, eating facilities, and water fountains. Equipment contaminated with blood or other body fluids of any worker, regardless of HTLV-III/LAV infection status, should be cleaned with soap and water or a detergent. A disinfectant solution or a fresh solution of sodium hypochlorite (household bleach, see above) should be used to wipe the area after cleaning.

OTHER ISSUES IN THE WORKPLACE

The information and recommendations contained in this document do not address all the potential issues that may have to be considered when making specific employment decisions for persons with HTLV-III/LAV infection. The diagnosis of HTLV-III/LAV infection may evoke unwarranted fear and suspicion in some co-workers. Other issues that may be considered include the need for confidentiality, applicable federal, state, or local laws governing occupational safety and health, civil rights of employees, workers' compensation laws, provisions of collective bargaining agreements, confidentiality of medical records, informed consent, employee and patient privacy rights, and employee right-to-know statutes.

DEVELOPMENT OF THESE RECOMMENDATIONS

The information and recommendations contained in these recommendations were developed and compiled by CDC and other PHS agencies in consultation with individuals representing various organizations. The following organizations were represented: Association of State and Territorial Health Officials, Conference of State and Territorial Epidemiologists, Association of State and Territorial Public Health Laboratory Directors, National Association of County Health Officials, American Hospital Association, United States Conference of Local Health Officers, Association for Practitioners in Infection Control, Society of Hospital Epidemiologists of America, American Dental Association, American Medical Association, American Nurses' Association, American Association of Medical Colleges, American Association of Dental Schools, National Institutes of Health, Food and Drug Administration, Food Research Institute, National Restaurant Association, National Hairdressers and Cosmetologists Association, National Gay Task Force, National Funeral Directors and Morticians Association, American Association of Physicians for Human Rights, and National Association of Emergency Medical Technicians. The consultants also included a labor union representative, an attorney, a corporate medical director, and a pathologist. However, these recommendations may not reflect the views of individual consultants or the organizations they represented.

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COMMUNITY BASED AIDS SUPPORT GROUPS

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Metropolitan St. Louis Area
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Greater Kansas City Joint Venture
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Ted Knapp, Convener

AIDS SURVEILLANCE COORDINATOR

Theodore D. Northup was appointed to the position of AIDS Surveillance Coordinator for the State of Missouri effective January 20, 1986. He will act as liaison for the Missouri Department of Health with hospitals and physicians most likely to see AIDS patients. His program will work to develop early reporting and high quality epidemiologic data pertaining to cases. He also will be involved in providing AIDS education and support to a variety of organizations, individuals and the general public.

Mr. Northup has been employed in the Bureau of Sexually Transmitted Diseases of the Missouri Department of Health since 1972; his assignment has been in the Department's District Health Office in Springfield.

Mr. Northup can be reached at the Bureau of Sexually Transmitted Diseases, Missouri Department of Health, 1730 E. Elm, Jefferson City, MO 65101 Phone: (314)751-6438.

The 51 cases of AIDS reported to the Department of Health in 1985 brought the cumulative number of AIDS reported since 1982 to 86. The cases diagnosed in 1985 represented a 46 percent increase over the cumulative number reported through the end of 1984.

HTLV-III ANTIBODY TESTING SITES
Locations, Phone Numbers & Trained Counselors

SITE #	LOCATION
1	ST. JOSEPH, MO St. Joseph/Buchanan County Health Department 904 So. 10th St. (Patee Hall) Terri Anderson, R.N. - PH: 816/271-4725
2	*SITE NO. 2* *NO LONGER IN OPERATION*
3	INDEPENDENCE, MO Jackson County Health Dept. 313 So. Liberty Marilyn Burkett, R.N.- PH: 816/881-4424
4	MARSHALL, MO Saline Co. Nursing Service 76 West Arrow Billie Vardiman, R.N.- PH: 816/886-3434
5	JOPLIN, MO Joplin City Health Dept. 513 Kentucky Avenue June Tatman, R.N. PH: 417/623-6122
6	SPRINGFIELD, MO Springfield/Greene County Health Department 227 E. Chestnut Expressway Desa Beezley, R.N. Maureen Miller, R.N. PH: 417/864-1686
7	MACON, MO Macon County Health Dept. 1131 Jackson Grace Osman, R.N. PH: 816/385-4711
8	COLUMBIA, MO Columbia/Boone County Health Department 600 East Broadway Linda Hancik, R.N. PH: 314/874-7355
9	JEFFERSON CITY, MO Cole County Health Dept. 210 Adams St. Ivah Braun, R.N. PH: 314/636-2181
10	FLAT RIVER, MO St. Francois County Health Department 1025 West Main Street Jane Hartrup, R.N. PH: 314/431-1947
11	POPLAR BLUFF, MO Butler Co. Health Dept. 1618 N. Main St. Vicky Sparkman, R.N. Barbara Cooper, L.P.N. PH: 314/785-8478/8479
12	ST. LOUIS, MO MAGDALA Foundation 4158 Lindell Blvd. Dan Glenn/Steve Randall PH: 314/652-6004

The public should be advised that the applicant should phone the test site for appointment to assure that a trained counselor is available.

EPIDEMIOLOGIST

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RECOMMENDED INFECTION-CONTROL PRACTICES FOR DENTISTRY

Dental personnel may be exposed to a wide variety of microorganisms in the blood and saliva of patients they treat in the dental operatory. These include Mycobacterium tuberculosis, hepatitis B virus, staphylococci, streptococci, cytomegalovirus, herpes simplex virus types I and II, human T-lymphotropic virus type III/lymphadenopathy-associated virus (HTLV-III/LAV), and a number of viruses that infect the upper respiratory tract. Infections may be transmitted in dental practice by blood or saliva through direct contact, droplets, or aerosols. Although not documented, indirect contact transmission of infection by contaminated instruments is possible. Patients and dental health-care workers (DHCWs) have the potential of transmitting infections to each other (1).

A common set of infection-control strategies should be effective for preventing hepatitis B, acquired immunodeficiency syndrome, and other infectious diseases caused by bloodborne viruses (2-4). The ability of hepatitis B virus to survive in the environment (5) and the high titers of virus in blood (6) make this virus a good model for infection-control practices to prevent transmission of a large number of other infectious agents by blood or saliva. Because all infected patients cannot be identified by history, physical examination, or readily available laboratory tests (3), the following recommendations should be used routinely in the care of all patients in dental practices.

MEDICAL HISTORY

Always obtain a thorough medical history. Include specific questions about medications, current illnesses, hepatitis, recurrent illnesses, unintentional weight loss, lymphadenopathy, oral soft tissue lesions, or other infections. Medical consultation may be indicated when a history of active infection or systemic disease is elicited.

USE OF PROTECTIVE ATTIRE AND BARRIER TECHNIQUES

1. For protection of personnel and patients, gloves must always be worn when touching blood, saliva, or mucous membranes (7-10). Gloves must be worn by DHCWs when touching blood-soiled items, body fluids, or secretions, as well as surfaces contaminated with them. Gloves must be worn when examining all oral lesions. All work must be completed on one patient, where possible, and the hands must be washed and regloved before performing procedures on another patient. Repeated use of a single pair of gloves is not recommended, since such use is likely to produce defects in the glove material, which will diminish its value as an effective barrier.

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2. Surgical masks and protective eyewear or chin-length plastic face shields must be worn when splashing or spattering of blood or other body fluids is likely, as is common in dentistry (11,12).

3. Reusable or disposable gowns, laboratory coats, or uniforms must be worn when clothing is likely to be soiled with blood or other body fluids. If reusable gowns are worn, they may be washed, using a normal laundry cycle. Gowns should be changed at least daily or when visibly soiled with blood (13).

4. Impervious-backed paper, aluminum foil, or clear plastic wrap may be used to cover surfaces (e.g., light handles or x-ray unit heads) that may be contaminated by blood or saliva and that are difficult or impossible to disinfect. The coverings should be removed (while DHCWs are gloved), discarded, and then replaced (after ungloving) with clean material between patients.

5. All procedures and manipulations of potentially infective materials should be performed carefully to minimize the formation of droplets, spatters, and aerosols, where possible. Use of rubber dams, where appropriate, high-speed evacuation, and proper patient positioning should facilitate this process.

HANDWASHING AND CARE OF HANDS

Hands must always be washed between patient treatment contacts (following removal of gloves), after touching inanimate objects likely to be contaminated by blood or saliva from other patients, and before leaving the operatory. The rationale for handwashing after gloves have been worn is that gloves become perforated, knowingly or unknowingly, during use and allow bacteria to enter beneath the glove material and multiply rapidly. For many routine dental procedures, such as examinations and nonsurgical techniques, handwashing with plain soap appears to be adequate, since soap and water will remove transient microorganisms acquired directly or indirectly from patient contact (13). For surgical procedures, an antimicrobial surgical handscrub should be used (14). Extraordinary care must be used to avoid hand injuries during procedures. However, when gloves are torn, cut, or punctured, they must be removed immediately, hands thoroughly washed, and regloving accomplished before completion of the dental procedure. DHCWs who have exudative lesions or weeping dermatitis should refrain from all direct patient care and from handling dental patient-care equipment until the condition resolves (15).

USE AND CARE OF SHARP INSTRUMENTS AND NEEDLES

1. Sharp items (needles, scalpel blades, and other sharp instruments) should be considered as potentially infective and must be handled with extraordinary care to prevent unintentional injuries.

2. Disposable syringes and needles, scalpel blades, and other sharp items must be placed into puncture-resistant containers located as close as practical to the area in which they were used. To prevent needlestick injuries, disposable needles should not be recapped; purposefully bent or broken; removed from disposable syringes; or otherwise manipulated by hand after use.

3. Recapping of a needle increases the risk of unintentional needlestick injury. There is no evidence to suggest that reusable aspirating-type syringes used in dentistry should be handled differently from other syringes. Needles of these devices should not be recapped, bent, or broken before disposal.

4. Because certain dental procedures on an individual patient may require multiple injections of anesthetic or other medications from a single syringe, it would be more prudent to place the unsheathed needle into a 'sterile field' between injections rather than to recap the needle between injections. A new (sterile) syringe and a fresh solution should be used for each patient.

INDICATIONS FOR HIGH-LEVEL DISINFECTION OR STERILIZATION OF INSTRUMENTS

Surgical and other instruments that normally penetrate soft tissue and/or bone (e.g., forceps, scalpels, bone chisels, scalers, and surgical burs) should be sterilized after each use. Instruments that are not intended to penetrate oral soft tissues or bone (e.g., amalgam condensers, plastic instruments, and burs) but that may come into contact with oral tissues should also be sterilized after each use, if possible; however, if sterilization is not feasible, the latter instruments should receive high-level disinfection (3,13,16).

METHODS FOR HIGH-LEVEL DISINFECTION OR STERILIZATION

Before high-level disinfection or sterilization, instruments should be cleaned to remove debris. Cleaning may be accomplished by a thorough scrubbing with soap and water or a detergent, or by using a mechanical device (e.g., an ultrasonic cleaner). Persons involved in cleaning and decontaminating instruments should wear heavy-duty rubber gloves to prevent hand injuries. Metal and heat-stable dental instruments should be routinely sterilized between use by steam under pressure (autoclaving), dry heat, or chemical vapor.

The adequacy of sterilization cycles should be verified by the periodic use of spore-testing devices (e.g., weekly for most dental practices) (13). Heat- and steam-sensitive chemical indicators may be used on the outside of each pack to assure it has been exposed to a sterilizing cycle. Heat-sensitive instruments may require up to 10 hours' exposure in a liquid chemical agent registered by the U.S. Environmental Protection Agency (EPA) as a disinfectant/sterilant; this should be followed by rinsing with sterile water. High-level disinfection may be accomplished by immersion in either boiling water for at least 10 minutes or an EPA-registered disinfectant/sterilant chemical for the exposure time recommended by the chemical's manufacturer.

DECONTAMINATION OF ENVIRONMENTAL SURFACES

At the completion of work activities, countertops and surfaces that may have become contaminated with blood or saliva should be wiped with absorbent toweling to remove extraneous organic material, then disinfected with a suitable chemical germicide. A solution of sodium hypochlorite (household bleach) prepared fresh daily is an inexpensive and very effective germicide. Concentrations ranging from 5,000 ppm (a 1:10 dilution of household bleach) to 500 ppm (a 1:100 dilution) sodium hypochlorite are effective, depending on the amount of organic material (e.g., blood, mucus, etc.) present on the surface to be cleaned and disinfected. Caution should be exercised, since sodium hypochlorite is corrosive to metals, especially aluminum.

DECONTAMINATION OF LABORATORY SUPPLIES AND MATERIALS

Blood and saliva should be thoroughly and carefully cleaned from laboratory supplies and materials that have been used in the mouth (e.g., impression materials, bite registration), especially before polishing and grinding intra-oral devices. Materials, impressions, and intra-oral appliances should be cleaned and disinfected before being handled, adjusted, or sent to a dental laboratory (17). These items should also be cleaned and disinfected when returned from the dental laboratory and before placement in the patient's mouth. Because of the ever-increasing variety of dental materials used intra-orally, DHCWs are advised to consult with manufacturers as to the stability of specific materials relative to disinfection procedures.

A chemical germicide that is registered with the EPA as a "hospital disinfectant" and that has a label claim for mycobactericidal (e.g., tuberculocidal) activity is preferred, because mycobacteria represent one of the most resistant groups of microorganisms; therefore, germicides that are effective against mycobacteria are also effective against other bacterial and viral pathogens (15). Communication between a dental office and a dental laboratory with regard to handling and decontamination of supplies and materials is of the utmost importance.

USE AND CARE OF ULTRASONIC SCALERS, HANDPIECES, AND DENTAL UNITS

1. Routine sterilization of handpieces between patients is desirable; however, not all handpieces can be sterilized. The present physical configurations of most handpieces do not readily lend them to high-level disinfection of both external and internal surfaces (see 2 below); therefore, when using handpieces that cannot be sterilized, the following cleaning and disinfection procedures should be completed between each patient: After use, the handpiece should be flushed (see 2 below), then thoroughly scrubbed with a detergent and water to remove adherent material. It should then be thoroughly wiped with absorbent material saturated with a chemical germicide that is registered with the EPA as a "hospital disinfectant" and is mycobactericidal at use-dilution (15). The disinfecting solution should remain in contact with the handpiece for a time specified by the disinfectant's manufacturer. Ultrasonic scalers and air/water syringes should be treated in a similar manner between patients. Following disinfection, any chemical residue should be removed by rinsing with sterile water.

2. Because water retraction valves within the dental units may aspirate infective materials back into the handpiece and water line, check valves should be installed to reduce the risk of transfer of infective material (18). While the magnitude of this risk is not known, it is prudent for water-cooled handpieces to be run and to discharge water into a sink or container for 20-30 seconds after completing care on each patient. This is intended to physically flush out patient material that may have been aspirated into the handpiece or water line. Additionally, there is some evidence that overnight bacterial accumulation can be significantly reduced by allowing water-cooled handpieces to run and to discharge water into a sink or container for several minutes at the beginning of the clinic day (19). Sterile saline or sterile water should be used as a coolant/irrigator when performing surgical procedures involving the cutting of soft tissue or bone.

HANDLING OF BIOPSY SPECIMENS

In general, each specimen should be put in a sturdy container with a secure lid to prevent leaking during transport. Care should be taken when collecting specimens to avoid contamination of the outside of the container. If the outside of the container is visibly contaminated, it should be cleaned and disinfected, or placed in an impervious bag (20).

DISPOSAL OF WASTE MATERIALS

All sharp items (especially needles), tissues, or blood should be considered potentially infective and should be handled and disposed of with special precautions. Disposable needles, scalpels, or other sharp items should be placed intact into puncture-resistant containers before disposal. Blood, suctioned fluids, or other liquid waste may be carefully poured into a drain connected to a sanitary sewer system. Other solid waste contaminated with blood or other body fluids should be placed in sealed, sturdy impervious bags to prevent leakage of the contained items. Such contained solid wastes can then be disposed of according to requirements established by local or state environmental regulatory agencies and published recommendations (13,20).

Developed by Dental Disease Prevention Activity, Center for Prevention Svcs, Hospital Infections Program, Center for Infectious Diseases, CDC.

Editorial Note: All DHCWs must be made aware of sources and methods of transmission of infectious diseases. The above recommendations for infection control in dental practices incorporate procedures that should be effective in preventing the transmission of infectious agents from dental patients to DHCWs and vice versa. Assessment of quantifiable risks to dental personnel and patients for specific diseases requires further research. There is no current documentation of patient-to-patient blood- or saliva-borne disease transmission from procedures performed in dental practice. While few in number, reported outbreaks of dentist-to-patient transmission of hepatitis B have resulted in serious and even fatal consequences (9).

Herpes simplex virus has been transmitted to over 20 patients from the fingers of a DHCW (10). Serologic markers for hepatitis B in dentists have increased dramatically in the United States over the past several years, which suggests current infection-control practices have been insufficient to prevent the transmission of this infectious agent in the dental operatory. While vaccination for hepatitis B is strongly recommended for dental personnel (21), vaccination alone is not cause for relaxation of strict adherence to accepted methods of asepsis, disinfection, and sterilization.

Various infection-control guidelines exist for hospitals and other clinical settings. Dental facilities located in hospitals and other institutional settings have generally utilized existing guidelines for institutional practice. These recommendations are offered as guidance to DHCWs in noninstitutional settings for enhancing infection-control practices in dentistry; they may be useful in institutional settings also.

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RECOMMENDATIONS FOR PREVENTING TRANSMISSION OF INFECTION WITH HUMAN T-LYMPHOTROPIC VIRUS TYPE III/LYMPHADENOPATHY-ASSOCIATED VIRUS DURING INVASIVE PROCEDURES

BACKGROUND

On November 15, 1985, "Recommendations for Preventing Transmission of Infection with Human T-Lymphotropic Virus Type III/Lymphadenopathy-Associated Virus in the Workplace," was published (1). That document gave particular emphasis to health-care settings and indicated that formulation of further specific recommendations for preventing human T-lymphotropic virus type III/lymphadenopathy-associated virus (HTLV-III/LAV) transmission applicable to health-care workers (HCWs) who perform invasive procedures was in progress. Toward that end, a 2-day meeting was held at CDC to discuss draft recommendations applicable to individuals who perform or assist in invasive procedures.

Following the meeting, revised draft recommendations for HCWs who have contact with tissues or mucous membranes while performing or assisting in operative, obstetric, or dental invasive procedures were sent to participants for comment. In addition, 10 physicians with expertise in infectious diseases and the epidemiology of HTLV-III/LAV infection were consulted to determine whether they felt additional measures or precautions beyond those recommended below were indicated. These 10 experts did not feel that additional recommendations or precautions were indicated.

DEFINITIONS

In this document, an operative procedure is defined as surgical entry into tissues, cavities, or organs or repair of major traumatic injuries in an operating or delivery room, emergency department, or outpatient setting, including both physicians "and dentists" offices. An obstetric procedure is defined as a vaginal or cesarean delivery or other invasive obstetric procedure where bleeding may occur. A dental procedure is defined as the manipulation, cutting, or removal of any oral or perioral tissues, including tooth structure, where bleeding occurs or the potential for bleeding exists.

RECOMMENDATIONS

There have been no reports of HTLV-III/LAV transmission from an HCW to a patient or from a patient to an HCW during operative, obstetric, or dental invasive procedures. Nevertheless, special emphasis should be placed on the following precautions to prevent transmission of bloodborne agents between all patients and all HCWs who perform or assist in invasive procedures.

1. All HCWs who perform or assist in operative, obstetric, or dental invasive procedures must be educated regarding the epidemiology, modes of transmission, and prevention of HTLV-III/LAV infection and the need for routine use of appropriate barrier precautions during procedures and when handling instruments contaminated with blood after procedures.

2. All HCWs who perform or assist in invasive procedures must wear gloves when touching mucous membranes or nonintact skin of all

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patients and use other appropriate barrier precautions when indicated (e.g., masks, eye coverings, and gowns, if aerosolization or splashes are likely to occur). In the dental setting, as in the operative and obstetric setting, gloves must be worn for touching all mucous membranes and changed between all patient contacts. If a glove is torn or a needlestick or other injury occurs, the glove must be changed as promptly as safety permits and the needle or instrument removed from the sterile field.

3. All HCWs who perform or assist in vaginal or cesarean deliveries must use appropriate barrier precautions (e.g., gloves and gowns) when handling the placenta or the infant until blood and amniotic fluid have been removed from the infant's skin. Recommendations for assisting in the prevention of perinatal transmission of HTLV-III/LAV have been published (2).

4. All HCWs who perform or assist in invasive procedures must use extraordinary care to prevent injuries to hands caused by needles, scalpels, and other sharp instruments or devices during procedures; when cleaning used instruments; during disposal of used needles; and when handling sharp instruments following procedures. After use, disposable syringes and needles, scalpel blades, and other sharp items must be placed in puncture-resistant containers for disposal. To prevent needlestick injuries, needles should not be recapped; purposefully bent or broken; removed from disposable syringes; or otherwise manipulated by hand. No data are currently available from controlled studies examining the effect, if any, of the use of needle-cutting devices on the incidence of needlestick injuries.

5. If an incident occurs during an invasive procedure that results in exposure of a patient to the blood of an HCW, the patient should be informed of the incident, and previous recommendations for management of such exposures (1) should be followed.

6. No HCW who has exudative lesions or weeping dermatitis should perform or assist in invasive procedures or other direct patient-care activities or handle equipment used for patient care.

7. All HCWs with evidence of any illness that may compromise their ability to adequately and safely perform invasive procedures should be evaluated medically to determine whether they are physically and mentally competent to perform invasive procedures.

8. Routine serologic testing for evidence of HTLV-III/LAV infection is not necessary for HCWs who perform or assist in invasive procedures or for patients undergoing invasive procedures, since the risk of transmission in this setting is so low. Results of such routine testing would not practically supplement the precautions recommended above in further reducing the negligible risk of transmission during operative, obstetric, or dental invasive procedures.

Previous recommendations (1,3,4) should be consulted for: (1) preventing transmission of HTLV-III/LAV infection from HCWs to patients and patients to HCWs in health-care settings other than those described in

this document; (2) preventing transmission from patient to patient; (3) sterilizing, disinfecting, housekeeping, and disposing of waste; and (4) managing parenteral and mucous-membrane exposures of HCWs and patients. Previously recommended precautions (1) are also applicable to HCWs performing or assisting in invasive procedures.

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SAFETY OF THERAPEUTIC IMMUNE GLOBULIN PREPARATIONS WITH RESPECT TO TRANSMISSION OF HUMAN T-LYMPHOTROPIC VIRUS TYPE III/ LYMPHADENOPATHY-ASSOCIATED VIRUS INFECTION

Immune globulins produced by plasma fractionation methods approved for use in the United States have not been implicated in the transmission of infectious agents. Nevertheless, because immune globulins manufactured before 1985 were derived from plasma of human donors who were not screened for antibody to human T-lymphotropic virus type III/lymphadenopathy-associated virus (HTLV-III/LAV), CDC and the U.S. Food and Drug Administration (FDA) have received inquiries concerning the safety of immune globulin (IG), hepatitis B immune globulin (HBIG), and intravenous immune globulin (IVIG). Current epidemiologic and laboratory evidence shows that these preparations carry no discernable risk of transmitting HTLV-III/LAV infection and that current indications for their clinical use should not be changed based on such concerns.

BACKGROUND

The IG, HBIG, IVIG, and other special immune globulins used in the United States are produced by several manufacturers using the Cohn-Oncley fractionation process (1,2). This process involves a series of precipitation steps performed in the cold with addition of varying concentrations of ethanol. Production lots of IG and IVIG are made from plasma pools from at least 1,000 donors; HBIG and other specific immune globulins (e.g., varicella-zoster IG) may be prepared from plasma pools from fewer donors.

Before 1985, donors were screened only for hepatitis B surface antigen but not by other tests for specific diagnosis of viral infections. Since April 1985, all donor units also have been screened for antibodies to HTLV-III/LAV, and all repeatedly reactive units have been discarded. Tests conducted at FDA and CDC have shown that as many as two-thirds of HBIG lots, as well as some lots of IG and IVIG, produced between 1982 and 1985 may have been positive for HTLV-III/LAV antibody. The question of safety arises out of concern that some immune globulins currently available were prepared from plasma pools that included units from donors who may have had HTLV-III/LAV viremia.

EPIDEMIOLOGIC STUDIES

Several studies have shown that recipients of HBIG and IG, including recipients of lots known to be positive for antibody to HTLV-III/LAV, did not seroconvert to antibody to HTLV-III/LAV-positivity and have not developed signs and symptoms of acquired immunodeficiency syndrome (AIDS) or other illnesses suggesting HTLV-III/LAV infection.

Since August 1983, CDC has enrolled 938 individuals who have had parenteral or mucous-membrane exposures to blood or body fluids of AIDS patients in a prospective surveillance study. To date, 451 entrants have been followed and tested for HTLV-III/LAV antibody. Of these, 183 persons received IG and/or HBIG as prophylaxis against hepatitis B infection; 100 (55%) received only IG; 65 (36%) received only HBIG; and 18 (10%) received both. One of the 183 HBIG recipients is now positive for HTLV-III/LAV antibody, but no preexposure serum was available for this individual, and seropositivity may have predated the needlestick exposure and IG prophylaxis. Further, heterosexual transmission of HTLV-III/LAV infection in this individual cannot be ruled out. No documented seroconversions have occurred in any of the 183 health-care workers who received IG or HBIG. Studies have been reported of 16 subjects who received HBIG that was strongly positive for HTLV-III/LAV antibody (3). Each patient had been given one to five ampules. A total of 31 doses were administered to 16 individuals. Low levels of passively acquired HTLV-III/LAV antibody were detected shortly after injection, but reactivity did not persist. Six months after the last HBIG injection, none of the 16 individuals had antibody to HTLV-III/LAV.

In a study of prophylaxis against cytomegalovirus (CMV) infections among kidney-transplant patients, 16 patients received CMV-specific IVIG preparations subsequently found to contain HTLV-III/LAV antibody. After 10 months or longer of follow-up, none of the 16 recipients developed antibody or other evidence of HTLV-III/LAV infection.

In studies of a group of IVIG recipients, most of whom had idiopathic thrombocytopenia, none of 134 patients developed antibodies or other evidence of HTLV-III/LAV infection. Information regarding past therapy with immune globulins is available from 10,227 of 17,115 AIDS patients reported to CDC. Three hundred fifty-eight (4%) reported receipt of an IG preparation. All but seven of these patients also were members of groups known to be at high risk for developing AIDS. The percentage of patients with no recognized risk factors for AIDS was not significantly different among those who received immune globulins (7/358 (2%)) than among those who did not (358/9,869 (4%)).

LABORATORY STUDIES

Scientists at FDA recently evaluated the basic fractionation processes (1,2) used for production of immune globulins to determine effectiveness of those procedures in eliminating HTLV-III/LAV infectivity (4). Six sequential steps in a typical process were evaluated. The study was designed so that efficiency of eliminating HTLV-III/LAV at each step was measured. The degree to which HTLV-III/LAV was reduced by partitioning or inactivation at individual steps ranged from 10))-1)) to more than 10))-4)) of in vitro infectious units (IVIU)/ml. The effectiveness of virus removal in the entire process by partitioning and inactivation was calculated to be greater than 1 x 10((15)) IVIU/ml.

Concentrations of infectious HTLV-III/LAV in plasma of infected persons have been estimated to be less than 100 IVIU/ml. Further, FDA scientists have shown that the geometric mean infectivity titer of plasma from 43 HTLV-III/LAV infected persons was 0.02 IVIU/ml (4).

Thus, the margin of safety based on the removal of infectivity by the fractionation process is extremely high. Scientists at CDC and FDA also cultured 38 lots of HBIG, IVIG, and IG, most of which contained HTLV-III/LAV antibody. HTLV-III/LAV was not recovered from any lot tested.

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Editorial Note: The laboratory and epidemiologic studies referred to have shown that concern about HTLV-III/LAV infection associated with the use of immune globulins available in the United States is not warranted. Strategies for using immune globulins recommended by the Immunization Practices Advisory Committee should be followed (5).

Recently, concern has been expressed that patients who received IG prepared from plasma of donors not screened for HTLV-III/LAV antibody may have a passively acquired false-positive reaction for antibody (6). Passively acquired HTLV-III/LAV antibody from HBIG known to contain high levels of antibody has been reported (3). Based on the estimated half-life of globulins in plasma, it can be calculated that passively acquired antibodies might be detected in sera of recipients for as long as 6 months after administration of immune globulins. It is important to recognize this possibility when attempting to determine the significance of HTLV-III/LAV antibody in a person who has recently received immune globulins, especially HBIG.

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ALTERNATE TEST SITES

HTLV-III antibody testing will now be offered at the Westport Free Clinic, 4008 Baltimore, Kansas City, MO. A complete list of alternative test sites currently operating in Missouri appears below.

1) St. Joseph/Buchanan County Health Department 816/271-4725

2) Jackson County Health Department 816/881-4424

3) Saline County Nursing Service 816/886-3434

4) Joplin City Health Dept. 417/623-6122

5) Springfield/Greene County Health Dept. 417/864-1686

6) Macon County Health Dept. 816/385-4711

7) Columbia/Boone County Health Dept. 314/874-7355

8) Cole County Health Dept. 314/636-2181

9) St. Francois County Health Dept. 314/431-1947

10) Butler County Health Dept. 314/785-8478/8479

11) MAGDALA Foundation 314/652-6004

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